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Management Situation Analysis

Pinedale Resource Management Plan

Prepared for the Bureau of Land Management
Pinedale Field Office

Prepared By:

Booz | Allen | Hamilton

Pinedale

Bureau of Land Management

Department of the Interior

Pinedale Field Office

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Preliminary Draft

MANAGEMENT SITUATION ANALYSIS

Pinedale Resource Management Plan

Chapter 1
Chapter 2

Prepared for:
The Bureau of Land Management
July 2001

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Management Actions for the Remainder of the ACEC (Outside the Rock Creek Watershed):4-Error! Bookmark not define
Beaver Creek ACEC: 4-Error! Bookmark not defined.
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1.0 INTRODUCTION

1.1. PROJECT DESCRIPTION AND LOCATION

The Bureau of Land Management's (BLM) Pinedale Field Office area is located in western Wyoming (see Figure 1.1-1). Within the Field Office area, BLM administers the Pinedale Resource Management Plan (RMP) Planning Area (RMPPA), consisting of approximately 931,000 acres of public land surface and 1,185,000 of Federal mineral estate in Sublette, Lincoln, and Fremont counties. Approximately 919,000 acres in the Pinedale RMPPA are both Federal surface and Federal mineral estate. Figure 1.1-2 shows the location, major features, and places/names within the RMPPA. See Table 1.1-1 for a complete summary of land and mineral ownership and administrative jurisdictions within the RMPPA.

The public lands and Federal mineral estate within the Pinedale RMPPA boundaries are the subject of this document. Areas within the RMPPA administered by other Federal agencies such as lands administered by the U.S. Forest Service, the Bureau of Reclamation, and the U.S. Air Force do not apply to this document nor to the Pinedale Field Office's current land use planning efforts. Also, the Pinedale Field Office's other current planning effort is for the Snake River RMP.

1.2. PURPOSE AND NEED FOR A NEW PINEDALE RESOURCE MANAGEMENT PLAN

The Pinedale Field Office within BLM has the responsibility to prepare and modify, when necessary, the RMP for the Pinedale RMP Area. An RMP is a set of comprehensive long-range decisions concerning the use and management of resources administered by the BLM. In general, the RMP does two things:

- it provides an overview of goals, objectives, and needs associated with public lands management, and
- it resolves multiple-use conflicts or issues associated with those requirements that drive the preparation of the RMP.

The Record of Decision (ROD) for the existing Pinedale RMP was signed on December 12, 1988. The Pinedale RMP provides guidance and direction for management of approximately 931,000 acres of BLM-administered public land surface and 1,185,000 acres of BLM-administered Federal mineral estate in Sublette, Lincoln, and Fremont counties. Approximately 919,000 acres are both Federal surface and Federal mineral estate. The Pinedale planning area includes two wilderness study areas (WSAs – Scab Creek – which has been recommended for designation - and Lake Mountain), two areas of critical environmental concern (ACECs – Rock Creek and Beaver Creek), and three special recreation management areas (SRMAs – Scab Creek, Upper Green River, and Boulder Lake). Major land uses in the Planning Area include recreation, oil and gas development, and livestock grazing.

Considerable changes within the Pinedale Field Office Area have occurred since completion of the existing RMP (including amendment and maintenance actions). Heightened public awareness, increase in demand for use of the lands, and increase in land use conflict continue to challenge BLM's management goals and objectives. The Pinedale Field Office is facing a wide variety of issues affecting local communities, regional and state interests, and the management of our natural resources. Therefore, the Pinedale Field Office is preparing a new RMP for the Pinedale Field Office Area.

1.3. PURPOSE AND USE OF THE MANAGEMENT SITUATION ANALYSIS

The Management Situation Analysis (MSA) provides information that describes the physical and biological characteristics and condition of the resources within a planning area and how these resources are currently being managed. An analysis of the resource conditions and capabilities provides a reference for developing land use plans.

This document, the Management Situation Analysis (MSA), is the document representing a critical early component of BLM's land use planning process (Table 1.4-1). The land use planning process ultimately results in an RMP.

1.4. SYNOPSIS OF THE MAJOR PLANNING PROCESS STEPS

The BLM land use (or resource management plan -- RMP) planning process, explained in 43 CFR 1600, BLM 1601 Manual, and BLM Land Use Planning Handbook (H-1601-1), falls within the framework of the NEPA environmental analysis and decision making process described in the CEQ regulations of 40 CFR 1500-1508, the Department of the

Interior NEPA Manual (516 DM 1-7), and the BLM NEPA Handbook H-1790-1. Table 1.4-1 provides a summary of the planning steps. As noted in the table, public participation opportunities are provided throughout the process.

1.5. MANDATES AND AUTHORITIES FOR PREPARATION OF THE PINEDALE RMP/EIS

BLM's land use planning process (as described in 43 CFR 1600) intertwines requirements from two important laws:

- Federal Land Policy Management Act (FLPMA) of 1976: "The Secretary shall, with public involvement....develop, maintain, and when appropriate, revise land use plans." FLPMA sets the overall tone and policy concerning the management of BLM lands.
- National Environmental Policy Act (NEPA) of 1969: "Utilize a systematic, interdisciplinary approach which will insure the integrated use of the natural and social sciences and environmental design arts in planning and in decision making which may have an effect on man's environment." Because the development of a new RMP could cause significant impacts, NEPA requires the analysis and disclosure of potential environmental impacts in an EIS.

The planned process for the new Pinedale RMP/EIS includes consideration of both FLPMA and NEPA. Other Federal legislation has been enacted over the last 30 years to further establish a comprehensive environmental and land use planning framework. A summary of the relevant Federal statutes for the Pinedale RMP/EIS process are included in Appendix A.

1.6. CONSTRAINTS/CONSISTENCY REQUIREMENTS WITH OTHER ENTITIES

BLM land use plans and amendments must be consistent with officially approved or adopted resource-related plans of Indian tribes, other Federal agencies, and State and local governments to the maximum extent practical, given that BLM land use plans must also be consistent with the purposes, policies, and programs of FLPMA and other Federal laws and regulations applicable to public lands (see 43 CFR 1610.3-2 (a)).

If these other entities do not have officially approved or adopted resource-related plans, then BLM land use plans must, to the maximum extent practical, be consistent with their officially approved and adopted resource-related policies and programs. This consistency will be accomplished so long as BLM land use plans are consistent with the policies, programs, and provisions of public land laws and regulations (see 43 CFR 1610.3-2 (b)).

Before BLM approves proposed land use plan decisions, the Governor(s) must have 60 days to identify inconsistencies between the proposed plan and State plans and programs and to provide written comments to the State Director. (The BLM and the State may mutually agree upon a shorter review period satisfactory to both.) If the Governor(s) does not respond within this period, it is assumed that the proposed land use plan decisions are consistent. If the Governor recommends changes in the proposed plan or amendment that were not raised during the public participation process, the State Director shall provide the public with an opportunity to comment on the recommendations (see 43 CFR 1610.3-2 (e)). This public comment opportunity will be offered for 30 days and may coincide with the 30-day comment period for the Notice of Significant Change. If the State Director does not accept the Governor's recommendations, the Governor has 30 days to appeal in writing to the BLM Director (see 43 CFR 1610.3-2(e)).

1.7. PRELIMINARY PLANNING CRITERIA

Guidelines have been developed to assist in preparing the Pinedale RMP. These guidelines, or planning criteria, are the constraints or ground rules that are developed to guide and direct the planning review for and modification of the Pinedale RMP. The planning criteria serve to:

- Ensure that the planning effort follows and incorporates legal requirements, provides for management of all resource uses in the planning area, is focused on the issues, and is accomplished efficiently;
- Identify the scope and parameters of the planning effort; and
- Inform the public of what to expect of the planning effort.

Planning criteria are based on standards prescribed by laws and regulations; guidance provided by the BLM Wyoming State Director; results of consultation and coordination with the public, other agencies and governmental entities, and Indian tribes; analysis of information pertinent to the planning area; public input; and professional judgment.

The planning criteria focus on the development of management options and alternatives, analysis of their effects, and selection of the Preferred Alternative and the Proposed

RMP. Planning criteria applicable to the Pinedale RMP/EIS process are organized into several categories:

- General planning criteria
- Planning criteria for specific resource programs
- Planning criteria for developing alternatives
- Planning criteria for analyzing environmental consequences
- Planning criteria for selecting the preferred alternative
- Planning criteria for using the NEPA process to develop RMP planning and management decisions

The planning criteria for modification of the RMP to date have been developed in enough detail to ensure that the process is tailored for addressing the identified resources issues and to avoid unnecessary data collection and analysis. These criteria are shown in Appendix B. Additional planning criteria may be identified as the planning process progresses.

1.8. MANAGEMENT ISSUES

The process for developing an RMP/EIS begins with identifying the issues. Issues express concerns, conflicts, and problems with the existing management of public lands. Frequently, issues are based on how land uses affect resources. Some issues are concerned with how land uses can affect other land uses, or how the protection of resources affects land uses. The following preliminary planning issues for the Pinedale RMP have been identified and are presented below with no emphasis on priority.

- **Development of Energy Resources and Minerals Related Issues –** Special attention is needed to address mineral development (i.e., oil/gas, coalbed methane, coal, solar, and wind energy, diamonds and gold) and related transportation network conflicts with other land and resource uses and values. Principal considerations include disruptive activities and human presence in elk, deer, and fisheries habitat, big game (i.e., moose, elk, deer, antelope) crucial habitat (crucial winter range and birthing areas), and other important wildlife species habitats (e.g., sage grouse, plovers, raptors); and on recreation values, forage uses, air quality, sensitive vegetation types, and sensitive watersheds. Areas where surface-disturbing activities (e.g., mineral exploration and development activities, right-of-way construction activities, etc.) are suitable, not suitable, or should be restricted, need to be identified.

- **Land Tenure Adjustment –** There are some areas in the Pinedale Field Office Area that are isolated and difficult (legally or physically) to access and manage. Land disposals and acquisitions could provide improved access and manageability of public lands.

- **Vegetation Management –** There are conflicting demands for consumptive and nonconsumptive uses of the vegetation resources in the planning area. The basic problem is maintaining resource values and nonconsumptive uses while allowing for consumptive uses. Resource values include vegetative cover; watershed protection; maintenance and enhancement of riparian areas; soil stabilization; and maintenance and enhancement of wildlife habitat (particularly big game crucial winter range and habitat for candidate, sensitive, proposed, or threatened and endangered wildlife and vegetative species). Consumptive uses include livestock grazing, off-road vehicle use, and vegetation removal by mineral development, rights-of-way construction, and other surface disturbing activities. Vegetation is also removed by wildlife foraging.

- **Recreation, Cultural Resources (including National Historic Trails), and Paleontological Resources Management –** There are certain resources and areas that need protection while others need to be considered for more public and recreational uses. Off-highway vehicle use can conflict with other land and resource uses and can cause damage to resources, including wildlife and watershed values and other recreation values. Principal considerations include providing for suitable and sufficient recreation uses and facilities (both dispersed and commercial), visual resource management direction, off-road vehicle use designations, management of paleontological resources, and management of cultural and historical resources (of particular concern is the need for protection of Congressionally designated National Historic Trails, other significant emigrant trails, such as the Lander Trail, other historic transportation resources in the region, including prehistoric and historic Indian trails, early historic exploration trails, Expansion Era roads, and Native American respected places). Visual intrusions along these trails and surrounding Native American respected places are also an issue.

- **Wildland/Urban Interface –** New demands are being placed on public lands due to accelerated growth in and around cities and towns in the planning area. Growth has changed the way communities relate to surrounding public lands and has changed the communities' expectations. The basic problem is providing for public land management along with increased demands for public land and resource uses. Principal considerations include providing for healthy air and water quality, preventing water source depletion, and preventing fragmentation of wildlife habitat. Considerations also include providing for development patterns, transportation and utility corridor planning, and demands for open space and recreational uses, land tenure adjustments and wildland fire management.

- **Special Status Species Management –** Attention is needed to address management of special status species (threatened and endangered, proposed, candidate, and sensitive plant and animal species) and the interrelationships of these species with other resource uses and activities. Principal considerations include management of species habitat to ensure continued use by these species. Areas where other resource activities may conflict with special status species and their habitat requirements need to be identified.

- **Water Quality -** There are concerns with maintaining or improving water quality, and complying with State and Federal requirements.

- **Special Management Designations –** There are unique areas or sensitive lands and resources in the planning area that meet the criteria for protection and management under special management designations. There are two areas designated as areas of critical environmental concern (ACEC -- Rock Creek and Beaver Creek) that contain unique resources requiring special management attention. There are three special recreation management areas (SRMA--the Upper Green River, Boulder Lake, and Scab Creek SRMAs) containing recreation values that require special management attention. In some places, unique or sensitive lands and resources are in danger of being lost or compromised. Ross Butte, Milleson Draw, Bench Corral and Graphite Hollow are other areas that may warrant special management designation. There are also concerns that special management area designations may result in too many restrictions on the use of public lands.

Table 1.1-1. Land and Mineral Ownership and Administrative Jurisdictions Within the Pinedale RMP Planning Area.

Jurisdiction	**Acres**
Areas the Pinedale RMP Decisions Will Cover:	
A. Federal land/Federal minerals	918,137
B. Federal land/Non-federal minerals	10,648
C. Non-federal land/federal minerals	226,340
Total BLM-administered federal land surface to be covered by RMP decisions	928,137
Total BLM-administered federal mineral estate to be covered by RMP decisions	1,144,477
Areas the Pinedale RMP Decisions will NOT Cover:	
D. US Forest Service land/BLM minerals	1,009
E. Bureau Of Reclamation land/BLM minerals	1,494
F. US Fish and Wildlife Service land/BLM minerals	0
Total BLM-administered federal mineral estate that will NOT be covered by RMP decisions	
G. Private land/private minerals	396,699
Total land surface areas in the Pinedale RMP planning area (all ownership)	1,324,836

Table 1.4-1. Land Use Planning Process Steps.

PLANNING STEPS	DESCRIPTION	PUBLIC PARTICIPATION
Identify Issues	Identify issues or land use problems that need to be resolved. This is an on-going process.	
Develop Planning Criteria	Planning criteria establish constraints and guides for the planning process; streamline the process; establish standards, rules, and measures; set the scope of inventory and data collection; identify the range of alternatives; and estimate the extent of analysis.	
Issue Notice of Intent (NOI)	Publish the NOI in the *Federal Register*, local media, mailings, etc. The NOI identifies the preliminary issues and planning criteria and provides for a 30-day public review and comment period. This is also the start of the formal NEPA scoping process inviting the public to identify issues or land use problems that need to be resolved.	Public review and comment
Collect Inventory Data	Collect inventory data based on the planning criteria. Data are generally collected from existing sources. New data collection is limited to what is needed to resolve the planning issues identified.	Data call from public
Analyze the Management Situation	Gather information on the current management situation, describe pertinent physical and biological characteristics, and evaluate the capability and condition of the resources. This analysis provides a reference for developing and evaluating alternatives.	Public review and comment
Formulate Alternatives	Identify a range of reasonable combinations of resource uses and management practices. Develop reasonable alternatives that address issues identified during scoping and that offer a distinct choice among potential management strategies. Include a no action alternative.	
Estimate Effects of Alternatives	Estimate the impacts of each alternative on the environment and management situation.	
Select the Preferred Alternative	The Field Manager recommends to the State Director a preferred alternative that best resolves planning issues and promotes balanced multiple use objectives. The State Director approves the selection of the preferred alternative along with the other alternatives under consideration	
Issue Draft RMP/EIS	Publish the Notice of Availability (NOA) in the *Federal Register*, media, mailings, etc. The NOA notifies the public of the availability of the Draft RMP/EIS and provides for a 90-day public review and comment period.	Public review and comment
Prepare the Final RMP/EIS	Prepare the Final EIS to include responses to the comments received during review of the draft EIS.	

Table 1.4-1. Land Use Planning Process Steps.

PLANNING STEPS	DESCRIPTION	PUBLIC PARTICIPATION
Governor's Consistency Review	Initiate a 60-day Governor's review to identify inconsistencies with State or local plans.	State Government Review and comment
Notice of Significant Change	When a protest period or consistency review results in significant changes to the propose plan, issue a Notice of Significant Change providing an additional 30 comment period	30 day public comment period
Protests	The State Director may sign and implement that portion of the plan not under protest	Public protest to decisions
Plan Approval	Once protests have been resolved and the Governor's consistency review has been completed, the State Director approves the RMP by signing the Record of Decision (ROD).	
Monitor and Evaluate the RMP	Ensure that the plan is continually monitored and evaluated until it is replaced.	

Note: Some of the planning steps can be done simultaneously while others must be completed before a step can be started e.g. the alternatives have to be formulated before a preferred alternative can be determined.

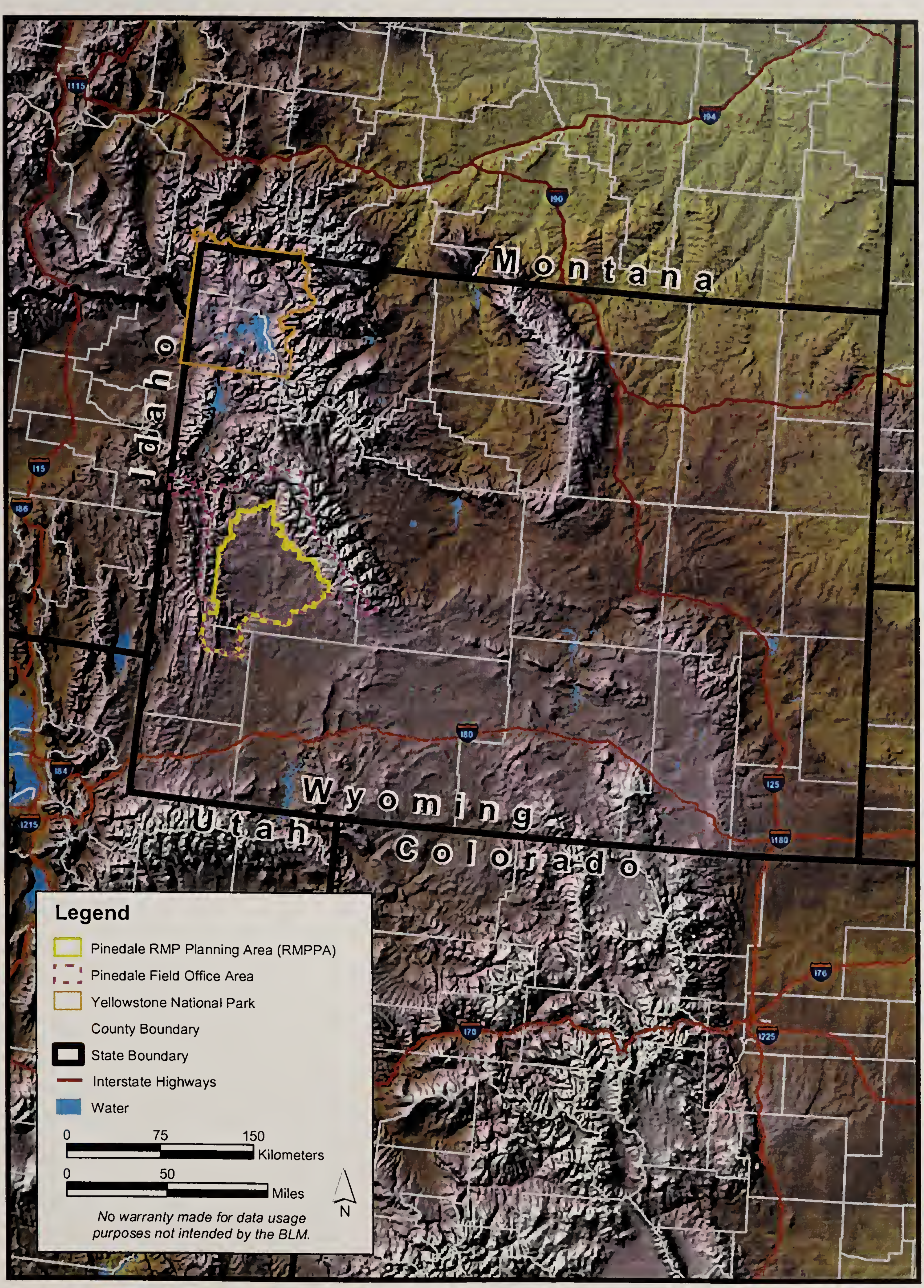
Montana
Idaho
Wyoming
Utah
Colorado
I115
I94
I90
I15
I86
I84
I215
I80
I25
I180
I76
I70
I225
Legend
Pinedale RMP Planning Area (RMPPA)
Pinedale Field Office Area
Yellowstone National Park
County Boundary
State Boundary
Interstate Highways
Water
0
75
150
Kilometers
0
50
Miles
N
No warranty made for data usage purposes not intended by the BLM.

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Figure 1.1-1. General Location Map.

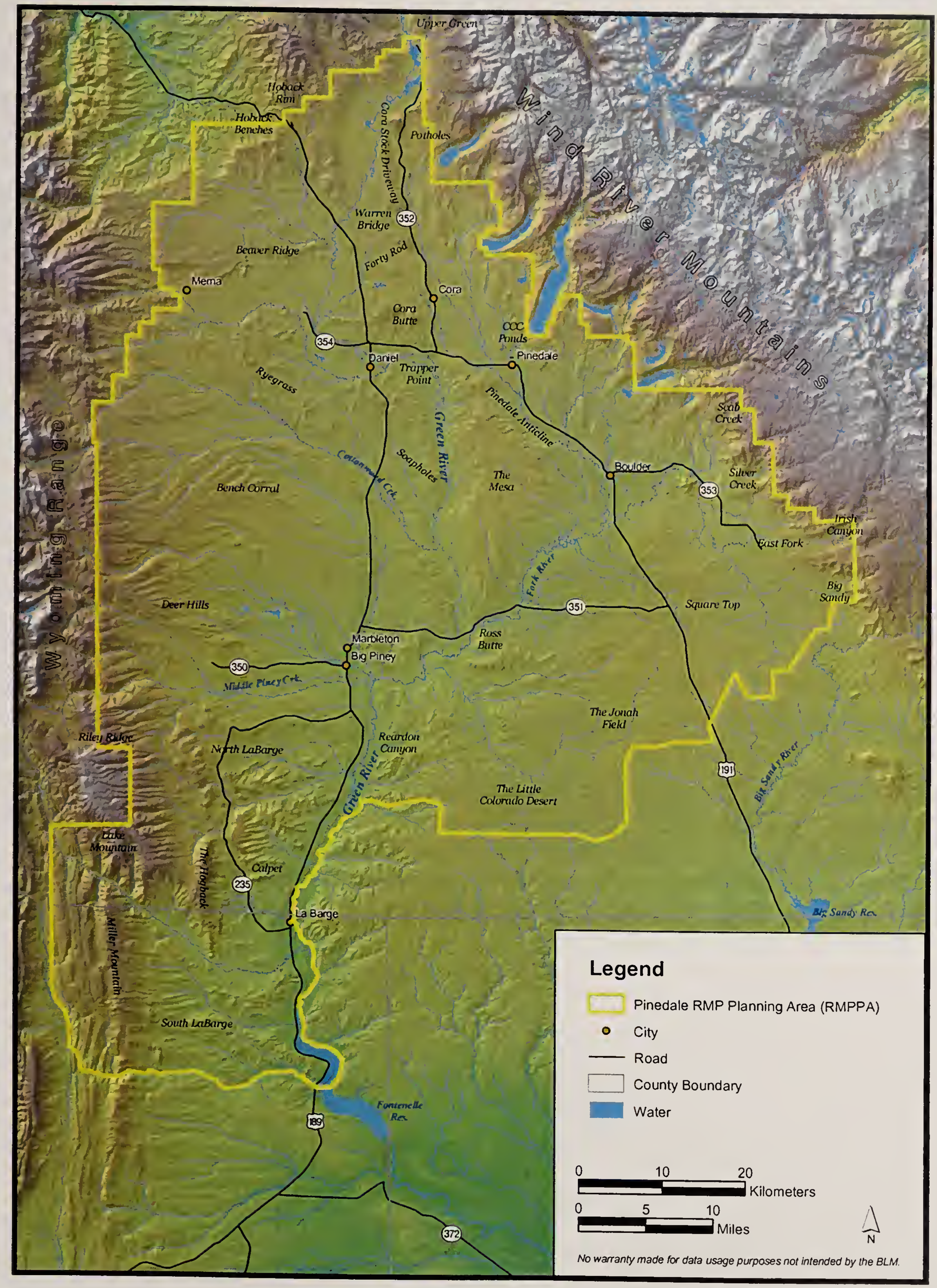
Upper Green
Hoback Rim
Hoback Benches
Cora Stock Driveway
Potholes
Wind River Mountains
Warren Bridge
352
Forty Rod
Beaver Ridge
Mema
Cora
Cora Butte
CCC Ponds
354
Daniel
Trapper Point
Pinedale
Ryegrass
Pinedale Anticline
Scab Creek
Green River
Soapholes
Cottonwood Crk
The Mesa
Boulder
353
Silver Creek
Bench Corral
Irish Canyon
East Fork
Wyoming Range
Fork River
Big Sandy
Deer Hills
351
Square Top
Marbleton
Big Piney
Ross Butte
350
Middle Piney Crk
The Jonah Field
Riley Ridge
North LaBarge
Reardon Canyon
Green River
191
Big Sandy River
The Little Colorado Desert
Lake Mountain
The Hogback
Calpet
235
La Barge
Big Sandy Res.
Miller Mountain
South LaBarge
Fontenelle Res.
189
372
Legend
Pinedale RMP Planning Area (RMPPA)
City
Road
County Boundary
Water
0
10
20
Kilometers
0
5
10
Miles
N
No warranty made for data usage purposes not intended by the BLM.

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Figure 1.1-2. RMP Planning Area Base Map.

2.0. CONTINUATION OF EXISTING MANAGEMENT DIRECTION

Chapter 2 describes the full range of management actions currently being employed to manage the resources in the Pinedale Field Office. Current management actions follow the guidelines stated in the *Pinedale Resource Area Approved Resource Management Plan of November 1988,* and are inclusive of all maintenance, amendments and revisions made as new information has been acquired.

BLM's resource management plans form the basis for every action and approved use on public lands. Planning emphasizes a collaborative environment, where local, State, and tribal governments, the public, local user groups, and industry work with the BLM to identify appropriate multiple uses of the public lands. The BLM and the Department of the Interior are currently working with Congress to address land management issues and to ensure that BLM has comprehensive and legally defensible plans that will support the use and management of the public lands.

The Pinedale Resource Management Plan (RMP) provides the management direction for approximately 931,000 acres of public surface and 1,185,000 acres of Federal mineral estate (approximately 919,000 of these acres are both Federal surface and Federal mineral estate) administered by the Bureau of Land Management within the Pinedale Resource Area. The Snake River Management Plan is being prepared by the Pinedale Filed Office and will be incorporated by reference in the Pinedale RMP. When completed, it will provide management decisions for the remaining BLM lands in the Teton Basin.

The resource area administrative boundary includes portions of Sublette, Lincoln, Teton, and Fremont counties. The RMP planning area includes portions of Sublette and Lincoln counties; and the towns of Pinedale, Big Piney, Marbleton, and LaBarge. Those Federal lands under surface administration of other Federal agencies (U.S. Forest Service, National Park Service, etc.) within the resource area boundary are not addressed. The Big Piney/LaBarge Area Approved Coordinated Activity Plan (CAP) provide management decisions for oil and gas development and livestock management in the Big Piney/LaBarge area. The Pinedale RMP will update and supersede the management decisions covered by this plan.

The approved Pinedale RMP as amended and augmented by various planning activities conducted on resource issues since 1988 represents a compilation of management actions and directions that are focused on resolving resource management, providing for multiple use management of the public lands and resources, and providing a basis for resource decision making on public lands managed by BLM within the field office boundaries. The RMP generally prescribes the future resource and land use allocations for the public lands administered by BLM in the Pinedale Resource Area. This process of resource and land use allocations guides subsequent activity planning and implementation and daily operations.

The Pinedale RMP has been kept current through maintenance, amendments, or revisions, as demands on public lands and resources change, as the land and resource conditions change, or as new information is acquired. Amendments for actions not in conformance with plan objectives have been considered, but not automatically initiated. Where analysis determines that the objectives established in the plan are the desired objectives, consistent with management guidance and decision reflected in the RMP, the RMP has not been amended, and nonconforming actions are not allowed.

Chapter 2 describes the full range of management actions currently being employed to manage the resources in the Pinedale Field Office.

2.1. AIR QUALITY

2.1.1. MANAGEMENT OBJECTIVES

Air quality management is conducted through cooperation with other agencies such as the Forest Service, Department of Environmental Quality, and the Environmental Protection Agency. Air quality is maintained within or above required standards through cooperative management of emissions with industry, the State of Wyoming, and other Federal agencies. Objectives include the protection of public health and safety and the well-being of sensitive natural resources. The Bureau will strive to minimize, within the scope of its authority, any emissions that may add to acid rain, cause violations of air quality standards, or degrade visibility.

The management objectives is to identify desired future conditions and area-wide criteria or restrictions, in cooperation with the appropriate air quality regulatory agency, that apply to direct or authorized emission-generating activities, including the Clean Air Act's requirements. The management actions must be in compliance with: applicable National Ambient Air Quality Standards (Section 106); State Implementation Plans (Section 110); Control of Pollution from Federal Facilities (Section 118); prevention of Significant Deterioration, including visibility impacts to mandatory Federal Class I Areas (Section 160 *et. seq.*); and Conformity Analysis and Determination (Section 176 (c)).

2.1.2. MANAGEMENT ACTIONS

The BLM will continue to:

- Cooperate and coordinate with the Forest Service, Environmental Protection Agency, and State of Wyoming in monitoring for atmospheric deposition (acid rain) and its impacts on the Class I airsheds of the Bridger and Fitzpatrick wilderness areas;
- Cooperate in the operation of the National Atmospheric Deposition Program (NADP)/National Trends Network acid rain monitoring site; and
- Cooperate in the collection of basic climate and meteorological data from remote automatic weather stations.

The data collected from the NADP/National Trends Monitoring site will be used to determine actual or potential impacts from air pollutant emissions and to provide information on proposed emission sources.

Special requirements to alleviate air quality impacts will be included on a case-by-case basis in land use authorizations (including lease stipulations). Examples of such requirements will include: limiting emissions, spacing of source densities, requiring the collection of meteorological data, covering conveyors at mine sites (to lower dust emissions), and placing restrictions on flaring of natural gas (to reduce sulfur dioxide emissions). Specific guidance for the application of air quality protection measures is found in *Standard Practices Applied to Standard Practices Applied to Surface-Disturbing Activities*, Appendix C (henceforward referred to as *Standard Practices for Surface-Disturbing Activities).*

The BLM State Office in Cheyenne is conducting a statewide Air Quality study to determine current air emission conditions on BLM administered lands in Wyoming. This study will be completed later in 2002.

2.2. CULTURAL RESOURCES

2.2.1. MANAGEMENT OBJECTIVES

The cultural resources of the BLM administered lands in the Pinedale Field Office will continue to be managed to: 1) resolve conflicts between cultural resources and other resource uses; 2) provide appropriate levels of protection for significant cultural resources; 3) design cultural resource management actions to maintain the value of cultural resources; and 4) provide for the scientific and educational use of cultural resources. (*The Standards for Healthy Public Rangelands and Guidelines for Livestock Grazing Management for Public Lands Administered by the Bureau of Land Management in the State of Wyoming, described in Appendix G, (amended April 28), 1998, (hereafter referred to as Standards for healthy public rangelands, Appendix D, amended April 28, 1998)).*

The Oregon National Historic Trail, designed by Congress in 1978, is administered by the National Park Service in partnership with the Bureau of Land Management, the Forest Service, State and local government units, citizen organizations, and numerous private individuals whose property the trail crosses.

2.2.2. MANAGEMENT ACTIONS

The various uses of the BLM-administered public lands are managed to avoid damage to cultural resources; minimize conflicts between uses of cultural resources and other uses of the public lands; provide for appropriate mitigation of unavoidable adverse effects on cultural resources prior to their disturbance or destruction; and identify and protect cultural resources.

The cultural resource process must be in compliance with the requirements of the *State Protocol Agreement between the Wyoming State Director and the Wyoming State*

Historic Preservation Officer, April 15, 1999, which supplements the National Programmatic Agreement. A synopsis of the most important elements of the aforementioned document is listed below and the full text is included in Appendix E:

- The Pinedale FO will prepare an annual summary report to the SHPO that describes actions implemented for each fiscal year. Data sharing and information management is required between the SHPO and the BLM offices.
- The BLM and the SHPO will work cooperatively to promote and enhance public education and outreach for historic preservation and cultural resource management.
- The BLM and SHPO will jointly work to develop standards and guidelines for the development of historic context within the Pinedale FO.
- The BLM will seek and consider the views of the public when carrying-out actions under the terms of the protocol.
- The BLM will consider the effects of its undertakings on historic properties significant to Native Americans.
- The BLM will ensure that historic properties that may be affected any undertakings are identified and evaluated in accordance with 36 CFR Part 800.
- The BLM will encourage applicant development of discovery plans for large and complex undertakings.

The Pinedale FO is required to consider the short and long-term management of cultural resources under Section 106 and 110 of the National Historic Preservation Act, Section 14 of the Archeological Resources Protection Act, and BLM's National Programmatic Agreement with the Advisory Council on Historic Preservation and the National Conference of State Historic Preservation Officers. This process is clarified in Information Bulletin # 2002-101. (See Appendix F for a copy of Information Bulletin #2002-101). In the referenced bulletin two goals are identified:

1) The preservation and protection of significant cultural resources.
2) The prevention against imminent threats from natural or human caused deterioration or potential conflict with other resource uses.

During any outreach process, groups and individuals with historic, scientific, interpretative, Native American, and similar kinds of information and interests will be invited to participate in the identification of the cultural resources in the RMP area.

Cultural resource management activity plans (such as the Oregon/Mormon Pioneer National Historic Trails Management Plan) will be completed and implemented to identify, salvage, and protect cultural and historical sites. Activity plans will be prepared for any current or future sites listed on, or determined eligible for the National Register of

Historic Places (NRHP), including sites 48LN300, 48SU350, and 48SU301, and the Overlook Rock Shelter, the Aspen Stone Circle site, the Cora Butte alignment site, the Willow Lake site, and the Boulder Lake site. Site-specific management prescriptions will be developed in the activity plans.

Pursuant to the Pinedale FO Cultural Heritage Strategic plan, the following actions will be taken:

- Identification and evaluation of the Rock Springs New Fork Wagon Road
- Improvement of the Lander Trail management
- Development of an on-going artifact curation program
- Prepare a bio-archaeological assessment of Ruby Butte; public education processes
- Stabilization of the Wardell Buffalo Trap site
- Protection of the Holden Hill Site; preservation of prehistoric rock art inscriptions
- Protection of artifact pilfering on the Jonah and Pinedale Anticline Fields
- Conduct annual meetings with key Native American Tribes
- Pursue stronger retaining working relationships with the public
- Implementation of the Boulder Lake Cultural Resource Management Plan. In addition, significant cultural resource sites will be nominated to the National Register of Historic Places as they are identified and evaluated.

As necessary, withdrawal from exploration and development of locatable minerals on significant cultural resource sites will be pursued.

Cultural resource management activity plans will be developed and implemented to identify, salvage, and protect cultural and historical sites.

Cooperative agreements will be pursued with local historical and archeological societies and other interested parties for attaining mutual historic preservation goals.

Lands actions (e.g., exchanges) in support of cultural resource management objectives will be pursued, as appropriate.

Compliance with the cultural resource management decisions and other requirements will be monitored on 1) the performance of cultural resource use permittees, and 2) stipulations on BLM leases and other use authorizations and selected sensitive sites.

2.3. FIRES

2.3.1. MANAGEMENT OBJECTIVES

The fire program will continue to be managed to protect public safety, life, and property while providing the maximum benefits of both prescribed fire and wildfire to overall resource management. (*Standards for healthy public rangelands, Appendix D, amended April 28, 1998)*

2.3.2. MANAGEMENT ACTIONS

Fire will be considered a management option for vegetation manipulation to:

- convert brush to other desired species,
- rejuvenate desired species,
- increase forage,
- increase vegetation nutrient value and palatability,
- promote wildlife habitat diversity,
- improve vegetation cover on areas with insufficient protective ground cover, and
- maintain or improve range, wildlife habitat, and watershed condition,
- reduce fuels in forest and range areas of high risk for wildfire and in urban interface areas.

Fire will also be considered a management option for disposal of timber slash, seed bed preparation, hazard reduction, control of disease or insects, thinning, or species manipulation in support of forest management objectives.

In preparing activity plans, consideration will be given to fire applications in meeting resource management objectives.

A fire management action plan that conforms with the *National Fire Plan* will be developed and implemented for the planning area. Specific boundaries and fire management prescriptions will be consistent with or in support of the other identified resource values and management objectives (Appendix G).

Areas will be identified where a prescribed set of conditions will be acceptable in the event of an ignition. Prescribed fires will generally be confined to 200 acres or less in areas where current vegetation stages are desirable.

Fire protection on public lands is managed by taking suppression actions appropriate to the terrain, resource management considerations and the need to protect health, safety and property. Figure 2 identifies specific steps to be taken for all decision pertaining to suppression of unplanned ignitions. Resource and operational support for presuppression and suppression planning will be coordinated with the Forest Service, Sublette County Sheriff's Office, Wyoming State Forestry Division, and local fire protection districts.

Wilderness areas are managed as prescribed fire areas. Fire suppression in wilderness areas requires restraint in suppression methods. In any designated wilderness areas, the fire management objective will be to manage fire in ways that will cause the least degradation to wilderness values.

Prescribed burning will be conducted so as to: 1) not violate ambient air quality standards, 2) avoid visibility impairment, 3) minimize public nuisance, and 4) minimize smoke intrusions into sensitive areas.

2.4. FORESTRY

2.4.1. MANAGEMENT OBJECTIVES

Forest resources will be managed to provide a supply of forest products to the various segments of the public (individual and commercial vendors) and to maintain or enhance other resource management objectives. *(Standards for healthy public rangelands, Appendix D, amended April 28, 1998).* Additional guidance for management of forest resources is provided in Appendix H.

2.4.2. MANAGEMENT ACTIONS

Consistent with forest management and other resource management objectives, the forested lands are classified into four management categories:

Category 1, Intensive Management, will include areas where the forested lands would be managed for multiple-use, but with emphasis placed on forest product utilization and forest management activities.

Category 2, Restricted Management, will include forested lands where wildlife, watershed, and recreation resource values will be emphasized and actions such as partial cutting, extended forest crop rotations, etc., or other restrictions to forest management, would be applied.

Category 3, Management to Enhance or Maintain Other Resources, will only allow forest management activities (e.g., harvesting or thinning) on lands in this category when such activities will benefit resources or values other than forestry or will promote public safety. All forest lands included in this category are not included in the forest management base or in timber harvest calculations.

Category 4, No Forest Management, includes all areas where forest management is not prescribed.

Table 2.4 - 1 (revised June 1993) shows the acreage distribution by management category. Approximately 24,223 acres of commercial conifer would be available for production of forest products. Of these 24,223 acres, approximately 20,652 acres will be subject to harvest method/equipment use and minimum cover level restrictions (Category 2). The remaining 3,571 acres would be unrestricted, except for general forest management guidelines applicable to all forest management activities (Category 1). Approximately 13,506 acres of woodland (Categories 1 and 2) will be available for forest product disposals on a demand basis. An additional 3,113 commercial conifer and woodland acres will be removed from the forest base (Categories 3 and 4). The 1,611 acres in Category 3 will be available for forest management activities when such activities are deemed necessary to maintain the integrity of the resource being protected (e.g., wildlife, watershed) or to promote public safety. All forest lands in categories 1, 2, and 3 will be available for emergency salvage of timber damaged or killed through insects, disease, wildfire, or other such events.

Forested lands in Categories 1 and 2 will be managed to harvest an estimated 18.2 million board feet of timber over a 20-year planning period. Average annual harvest level will involve approximately 137 acres, but may vary to meet individual sale area objectives, depending on proposed harvest methods and individual sale conditions.

Sales of forest products (sawtimber, firewood, Christmas trees, posts, poles, and wildlings) will be made available to individuals and to commercial vendors. Forest product sales will be conducted on all forest areas, except where specifically excluded (e.g., the Rock Creek drainage and 7,636 acres in the Scab Creek area).

In addition to harvest, approximately 1,200 acres of precommercial thinning will occur during the 20-year planning period. Precommercial thinning projects will generally be designed to achieve an 8-foot spacing (e.g., roughly 680 trees per acre would be left uncut) and should not significantly affect cover levels (Table 2.4 – 2).

Specific harvest and thinning sequences will be established in a forest management plan, which will establish a 20-year harvest schedule. Any forest management plans developed will be coordinated with adjacent landowners, the Forest Service, the WGFD, and other interested parties.

Specific items to be addressed in any individual timber sale plan and environmental assessments will include:

- Approximate harvest units and proposed harvest methods.
- Existing road locations.
- Proposed new roads.
- Roads to be closed.
- Harvest acreages.
- Environmental mitigations.
- Coordination with other resource programs and interests.

All forest management activities authorized under this plan will adhere to the following restrictions. Exceptions will require supporting environmental analysis and NEPA compliance.

- No clearcutting or tracked or wheel-type equipment operations will be allowed within a 100-foot buffer of riparian areas.
- Logging operations on slopes steeper than 45 percent will be limited to technologically, environmentally, and economically acceptable methods such as cable yarding and (or) horse skidding.
- No logging activities will be allowed from November 15 through April 30 in crucial elk winter ranges and feedgrounds, and from May 1 through June 30 in elk calving areas.

- Clear cut areas are limited to 25-acres and are permitted on a case-by-case basis. Clear cutting is considered on aspen stands, pine needle infestation stands, and mistletoe infected stands and is approved on a case-by-case basis.
- Regeneration in harvest units and burned areas must provide adequate elk hiding cover (vegetation capable of hiding 90 percent of an adult elk at a distance equal to or less than 200 feet), or must achieve preharvest stocking levels (numbers of trees per acre) with 12- to 15-foot tall trees, before timber harvesting will be allowed in adjacent stands. Exceptions will be allowed for emergency salvage of insect- or disease-infested timber and weather- or fire-damaged timber.
- Slash disposal will be tailored to the individual harvest unit to promote reforestation, minimize erosion, and allow big game movement. Methods that will be employed include broadcast burning, piling and burning, lopping and scattering, chipping, and roller chopping.
- Timber harvesting practices will be consistent with accepted silvicultural guidelines for each species but will also reflect individual stand conditions or other resource and environmental concerns.
- Artificial reforestation will be conducted to the extent necessary to eliminate the reforestation backlog and to ensure that minimum stocking levels on new clearcuts are achieved within 15 years after harvesting.
- Processing of individual timber sale proposals and individual forest management plans will evaluate areas for possible management as old growth timber.
- Aspen stands are managed to maintain or enhance wildlife values; however, they will also be used to produce wood products on a demand basis.

2.4.3. FOREST MANAGEMENT UNITS

Within the general forest management objective and guidelines, each of the following four management units has separate sub-objectives and planned actions.

2.4.3.1. Deadline-Pinegrove Unit.

The Deadline-Pinegrove unit will be managed to give full protection to the Colorado River cutthroat trout in the Rock Creek drainage and to maintain October 1985 levels of forest cover for wildlife in the remainder of the unit. Approximately 953 acres will be available for harvest over a 20-year period.

All forest management activities will be excluded in the Rock Creek drainage.

A minimum of 90 percent of the conifer acreage in the Graphite and Riley Ridge crucial elk winter ranges will be maintained. Annual cover level fluctuations will not be allowed except for emergency salvage.

No clearcutting or road construction will be allowed within 1,000 feet of Beaver Creek. Exceptions will be granted only if additional site-specific analysis verifies that such actions will not adversely affect crucial Colorado River cutthroat trout habitat.

2.4.3.2. North Piney Unit

The North Piney unit will be managed to give full protection to the elk feedgrounds and to maintain October 1985 levels of forest cover for wildlife, primarily elk.

All forest management activities will be excluded from the Finnegan and North Piney elk feedgrounds, except when such management would be necessary to maintain the integrity of the feedground environment.

Approximately 680 acres will be harvested for forest products over a 20-year period.

2.4.3.3. Miller Mountain Unit

The Miller Mountain unit will be managed to provide full protection to forested portions of the Fort Hill-Fontenelle elk winter range and to maintain approximately 90 percent of the conifer acreage in the remainder of the unit in cover for wildlife.

Forest management activities will be excluded from the Fort Hill elk winter range. Exceptions will be allowed for emergency salvage when the wildlife will benefit.

Approximately 396 acres or 10 percent of the conifer base, excluding the Fort Hill winter range, will be harvested over a 20-year period.

2.4.3.4. Eastside-Hoback Unit

The Eastside-Hoback unit will be managed to give full protection to the forested portions of the elk feedgrounds and to manage the remaining forested lands for forest products on an allowable harvest/sustained yield basis.

Approximately 781 acres will be harvested for forest products over the next 20 years, based on and prorated from figures in USDI 1985a (adjusted operational limits solution).

Forest management activities will be excluded from the Franz and Scab Creek elk feedground, except for salvage and sanitation harvests when necessary to maintain the integrity of the feedground environment to benefit the elk.

Other than for emergency salvage of damaged or dead trees and for public protection, no forest product harvesting will be allowed in the Scab Creek campground. Campers will be allowed to obtain firewood from designated areas.

2.5. HAZARDOUS MATERIALS

Currently, no management decisions or actions pertaining to hazardous materials exist in the Pinedale planning area. However, general guidelines and regulations for hazardous materials and waste management are found in BLM manuals *H-2101-4,* and *H-1703-1.* They should be referred to for in-depth information pertaining to Pre-Acquisition Environmental Site Assessments and CERCLA Response Actions.

2.5.1. MANAGEMENT OBJECTIVES

Management objectives for hazardous materials will include the following:

- Protecting public health, safety and the environment on public lands.
- Emphasizing waste reduction for BLM authorized and initiated actions.
- Complying with applicable Federal and State laws.
- Minimizing Federal exposure to the liabilities associated with hazardous materials management and waste management on public lands.
- Preventing waste contamination from BLM authorized actions.
- Integrating pollution prevention, hazardous materials and waste management, and waste reduction policies and controls into all BLM programs.

2.5.2 MANAGEMENT ACTIONS

For BLM –authorized activities that involve hazardous materials or their use, precautions will be taken to guard against releases into the environment. In the event of the release of hazardous materials on the public land, appropriate warnings will be provided to potentially affected communities and individuals. Precautions will be taken against public exposure to contaminated areas, and mitigation will be performed in accordance with applicable Federal and State laws and regulations.

Sale, exchange, or other transfer of public lands on which storage or disposal of hazardous substance has been know to occur will require public notification of the type and quantity of the substance. In accordance with the provisions of *602 Departmental Manual (DM) 2*, a Pre-Acquisition Environmental Assessment (ESA) following the procedures of Manual H-2101-4 will be required for all acquisitions of real property prior to acquisition.

Public lands contaminated with hazardous wastes would be reported, secured, and cleaned up according to Federal and State laws, regulations, and contingency plans, including the CERCLA. Parties responsible for contamination will be liable for cleanup and resource damage costs, as prescribed by law.

Surface-disturbing and disruptive activities associated with all types of hazardous materials and waste management and all types of fire management will be subject to appropriate mitigation.

2.6. LANDS AND REALTY

2.6.1. MANAGEMENT OBJECTIVES

The lands and realty objectives will continue to be to provide land use authorizations in support of public needs. This is to be done in consideration of and in compliance with the various management decisions, goals, objectives, and resource restrictions required to protect or maintain the multiple uses and resource values as described in the approved Pinedale RMP. The right to occupy or acquire public lands will be authorized under the appropriate realty actions within a multiple use management concept and within the objectives and guidance provided under all resources. (*Standards for healthy public rangelands, Appendix D, amended April 28, 1998)*

2.6.2. MANAGEMENT ACTIONS

Proposals for the disposal of public lands will be considered on a case-by-case basis (e.g., transfer from the administration of the BLM to other Federal agencies, or local or State governments, or disposal through methods such as public sale, exchange, State indemnity selection, or *Recreation and Public Purposes Act* leases or patents). Generally, the preferred method of disposal will be a value-for-value land exchange; however, any of the available methods may be used, as appropriate to individual situations. Prior to taking any disposal action, an environmental analysis will be conducted on the proposal and the involved lands will be evaluated for compliance with the disposal criteria listed in Appendix I and for consistency with objectives of this RMP.

Acreage will be disposed of according to the criteria established by the Pinedale FO for consideration of land for disposal. In addition, other public lands have been identified as suitable for disposal only by exchange (Appendix J). Proposals to dispose of any other BLM-administered public lands will be considered and evaluated on a case-by-case basis according to criteria developed by the Pinedale FO.

Special attention will be given to retaining enough public lands at the Cora Y highway crossing, at the south end of Fremont Lake, and at other important wildlife migration routes to provide for free movement of migrating big game animals. Disposal of all the lands in this area as specified in the 1988 RMP is no longer applicable.

Acquisition of non-Federal lands on a willing buyer, willing seller basis through land exchange or direct purchase will be pursued by BLM, if needed, to accomplish management objectives of this RMP. Such acquisition will primarily be considered in areas of predominantly Federal ownership, when other management options such as cooperative agreements are not available, and then primarily through exchange. Lands needed for wildlife habitat enhancement are identified in Appendix J. Other areas may be identified in the future.

Public lands administered by BLM along the Snake River are interspersed with private and state lands, and bounded upstream and downstream by lands administered by the National Park Service and US Forest Service. Some of the private and state lands are affected by recreational easements. Consistent with the management objectives of the Snake River RMP, these scattered tracts will be retained and managed for recreation, rather than for disposal as proposed in the 1988 Pinedale RMP. Cooperative management approaches with other agencies and private property owners will be required, in lieu of consolidation of land ownerships, to accomplish management objectives.

Realty actions (e.g., exchanges or sales) will be pursued to enhance and maintain key wildlife habitats. Land exchanges to acquire State and private lands in crucial habitats in important and predominantly Federal management areas (e.g., Rock Creek ACEC, New Fork Potholes, Miller Mountain, Pittsburgh and Midway area, and key riparian areas) will be pursued. BLM will enter into a dialog with the State of Wyoming to identify State lands suitable for exchange.

Currently, two land exchanges are being conducted by the Pinedale FO: 1) the Miller Mountain exchange, which proposes to acquire isolated 40 acre parcels of private lands in exchange for BLM administered public land; and 2) The Johnson Ridge Exchange.

The BLM State Office is processing another statewide land exchange. This exchange, known as the Pittsburgh and Midway land exchange, would convey 640 acres of Federal minerals for public lands identified by BLM Wyoming Field Offices.

2.7. LIVESTOCK GRAZING

2.7.1. MANAGEMENT OBJECTIVES

Implementation of integrated grazing management systems constitutes the primary means of improving or maintaining the desired range conditions. Approved Allotment Management Plans (AMPs) for each of the designated grazing allotments will continue to provide the necessary guidance for achieving grazing management objectives. Forage utilization levels are managed in accordance with individual approved AMPs. BLM staff work closely with operators in accordance with the *Standards for healthy public rangelands, Appendix D, (amended April 28, 1998)* to determine the most appropriate methods for achieving the standards.

Objectives of the livestock management program in riparian areas will include maintenance, restoration, and improvement of riparian values where livestock grazing has contributed to riparian management problems.

2.7.2. MANAGEMENT ACTIONS

2.7.2.1. Grazing Preference

Forage is made available for livestock grazing uses for protection or enhancement of other resource values. The current seasons of use, kinds of livestock, and amount of grazing use will continue until monitoring indicates a modification can be accommodated, or is necessary. The current grazing preference objective of approximately 105,000 animal unit months (AUMs) for cattle, 3,194 AUMs for horses, and 245 AUMs for sheep will be maintained or increased through implementation of allotment management plans (AMPs), range improvements, and vegetation manipulation. Any adjustments in livestock grazing use will be made as a result of monitoring and in consultation with grazing permittees and other affected interests.

All developed and semi-developed recreation sites and campsites will be closed to livestock grazing.

2.7.2.2. Unallotted Public Lands

Unallotted forage on BLM administered public lands will be considered for allocation on a case-by-case basis in accordance with RMP goals and objectives. The number of AUMs to be allocated will be determined after the range health, forage and other conditions of the subject lands have been evaluated.

2.7.2.3. Stock Trails

Adequate stock trails will be maintained to support livestock trailing needs. Withdrawals have been lifted on two livestock driveways in accordance with the 1988 RMP. Some acreage remains withdrawn and continues to be used for livestock movement.

2.7.2.4. Elk Winter Range

Adequate forage for wintering elk will be provided to the extent possible (population levels are based on a Wyoming Game and Fish Department population objectives, which are currently being updated, in the Bench Corral, Miller Mountain-Fort Hill, Riley Ridge, and Graphite elk winter ranges.

In cases where adequate forage for wintering elk is not available, adequate forage may be made available through a combination of management practices, including changes in livestock grazing systems, grazing adjustments, and vegetation manipulation. BLM will cooperate with allotment operators to accomplish winter forage objectives for elk in such cases.

Livestock water developments on public lands where crucial elk winter ranges are designated will only be allowed if they do not result in adverse impacts to the crucial range.

2.7.2.5. Allotment Management Plans

All allotments have been placed into one of three categories based on the established criteria in Appendix K. These policies will be revisited as current policies are suspended. These categories are:

- I- Improved Allotment
- M- Maintained Allotment
- C- Custodial Allotment

Two Allotment Management Plans (AMPs) and associated NEPA documentation were completed in 1992 and 1995. New AMPs will be written on an as-needed basis. As conditions change, and following consultation with the affected parties, an allotment may be placed in a different category. Current categorization is 41 I allotments, 141 M allotments, and 26 C allotments.

New AMPs will be written and implemented on I allotments (current list of priority shown in Appendix L). Existing AMPs on I allotments will be modified to meet livestock objectives, and, to incorporate wildlife and watershed objectives to be attained through livestock management. Existing AMPs on M category allotments will not be modified, unless monitoring and evaluation indicate a change in management is needed. New AMPs or activity plans will require environmental analyses.

All grazing systems will be designed to maintain or improve plant diversity. Specific objectives will be determined during AMP preparation to provide forage diversity for antelope, mule deer, and sage grouse as well as livestock. Grazing systems will be designed to limit forage competition for forbs and other desirable plants, particularly in the spring of the year.

2.7.2.6. Range Improvements

New range improvements will be implemented on I category allotments as first priority. The range improvements on M and C category allotments will be funded as priorities allow, or they could be implemented with other funds provided by permittees, other agencies, or local grazing boards. First priority within M and C allotments will be given to projects that have contributed funds. New range improvements (e.g., vegetation manipulation, water developments, and fencing) will be designed to the extent possible to meet multiple use objectives for all resources. The maintenance responsibility of range improvements will be assigned to the benefiting users. The maintenance and reconstruction of range improvements will be accomplished as needed.

Approximately 98,552 acres have been identified as suitable for vegetation manipulation to increase forage production in the I and M allotments. Brush control guidelines (Table 2.7 - 1) will be applied to acreages determined suitable for vegetation manipulation (Appendix M). The acreage figures in Appendix L were derived from computer-generated data (geographic information system and satellite imagery), which overlayed crucial wildlife ranges and areas with greater than 35 percent brush canopy.

The acreage displayed for each allotment (Appendix L) is considered a target figure for potential range improvements. Development of AMPs and other activity plans will further refine the acreage according to livestock grazing, wildlife, and other resource objectives. Some allotments have very small acreages available for treatment, and due to the high cost of treating such small areas, are therefore not likely to be treated. Other allotments containing large acreages may not receive the total projected treatment due to other resource considerations (e.g., sage grouse nesting areas and erodible soils). Acreage containing brush control may increase or decrease on certain allotments depending on rangeland management needs addressed in AMPs and other activity plans.

All brush control projects will involve site specific environmental analysis; coordination with affected livestock operators and the WGFD; and will include multiple use objectives for other resource uses including livestock, wildlife, and watershed.

All new project development will be required to meet the criteria in Appendix M and Appendix N. Range improvements will be done in accordance with RMP and activity plan objectives and priorities. Total project needs will be considered for each allotment before public funds are spent. A cost/benefit analysis will be completed on an allotment basis before range improvements are constructed with government funding.

To reduce streambank degradation, salt blocks for livestock and wildlife use are not allowed within 500 feet of live water, wetland, or riparian areas, unless the activity plans show that salt blocks would be necessary to meet management objectives.

2.7.2.7. Forage Increase

Any forage increases realized from management prescriptions and range improvement practices will be allocated to wildlife, watershed, and livestock. Site specific objectives for wildlife, watershed, and livestock grazing will be developed to identify each resource use to receive a forage allocation.

Actual forage allocation from forage increases will be based on site specific analysis and must conform to the multiple use objectives of the activity plans. The allocation of forage resulting from treatments financed by permittees, as in M category allotments that do not have crucial wildlife ranges, will be evaluated on a case-by-case basis. More forage may be allocated to livestock grazing than to other resource uses, in accordance with the current Federal grazing regulations, including consistency with the multiple use management objectives set forth in this document. Consultation with the affected parties will be necessary at the outset of planning for the project allocating increased forage to ensure satisfactory proportioning of the additional forage.

2.7.2.8. Combining and Splitting Allotments

Any combining or splitting of allotments to meet management objectives must be consistent with the approved RMP. Such actions will require consultation and coordination with the affected parties prior to a decision to split allotments.

2.7.2.9. Rangeland Monitoring and Evaluation

Monitoring of the range and the vegetation resource will be conducted at a level sufficient to detect changes in grazing use, trend, and range conditions. This data will be used to support and direct grazing management decisions consistent with national grazing policy (Appendix J). Ecological range site condition mapping is being conducted on all rangelands in the planning area.

2.7.2.10. Conversions in Kind

Requests for conversions from one type of livestock to another are evaluated on a case-by-case basis, require an environmental analysis, and will be allowed only if in conformance with the RMP. Conversions from cattle to sheep will generally not be allowed, particularly on crucial antelope and deer winter ranges.

2.8. MINERALS

2.8.1. MANAGEMENT OBJECTIVES

The public lands and Federal mineral estate will be made available for orderly and efficient development of mineral resources. All minerals actions will comply with goals, objectives, and resource restrictions (mitigations) required to protect the other resource values in the planning area and will be in compliance with NEPA. (*Standards for healthy public rangelands, Appendix D, amended April 28, 1998)*

2.8.2. MANAGEMENT ACTIONS

2.8.2.1. Leasable Minerals

Generally, under the existing approved RMP, the Pinedale Field Office planning area is open to consideration for exploration, leasing, and development for all leasable minerals, which include oil, gas, coal, oil shale, and geothermal steam, in accord with all applicable provisions (e.g., restrictions, prohibitions). All activities will be conducted in accordance with the *Guidelines for Surface-Disturbing Activities and Standard Practices for Surface-Disturbing Activities* (Appendices C and P)

2.8.2.2. Oil and Gas

The BLM evaluates industry-proposed measures to protect health and safety through the drilling permit process (Appendix O). Of particular concern will be the requirements of approved contingency plans for hydrogen sulfide (H2S) release. Requirements of operators could include conducting dispersion analyses to determine ambient H2S concentrations during well blowouts, collecting onsite meteorological data, preparing detailed evacuation plans, and placing offsite warning signs.

Oil and gas leases will be valid between five to ten years. The lease will be valid past this period as long as the producer is extracting oil or gas. The lease will be voided if the lessor takes no action to renew the lease after the expiration date. A maximum of four sections per lease is permitted. All leases will be allocated through the nomination process coordinated by the BLM Cheyenne State Office. The BLM Pinedale FO is responsible for implementation of the leasing and monitoring process. The granting of a lease is a discretionary action.

Once an oil and gas lease has been issued, it constitutes a valid existing right and BLM cannot unilaterally change the terms and conditions of a lease. Therefore, in areas where oil and gas exploration and development activities are restricted or are areas closed to oil and gas leasing, an existing lease in the area would not be affected by the closure and restrictions cannot be added to the lease. Closures and additional lease restrictions could not be fully implemented until after a lease expires and new leases are issued for the same area. However, additional restrictions can be applied at the Application for Permit to Drill (APD) stage, and at subsequent development stages, that would mitigate potential impacts from oil and gas operations within existing lease areas so long as rights to develop the leases remain intact (Appendix O).

The Riley Ridge Project Monitoring Program will be continued. Further monitoring will include gathering of geological data in the Deadline Ridge-Graphite Hollow crucial elk winter range to aid in preparation of the proposed activity plan. Monitoring will be coordinated with other resource monitoring programs such as wildlife, surface and ground water quality, grazing, and cultural resources, as appropriate. In addition, the Lake Mountain WSA is closed to oil leasing. This is inclusive of Rock Creek ACEC, which falls within the WSA, therefore the same restrictions apply.

The 7,636-acre Scab Creek area will be closed to oil and gas leasing. The remainder of the planning area (approximately 1,185,000 acres) will be open to consideration for leasing, exploration, and development of oil and gas.

In 2000, the BLM Pinedale FO withheld new leases north of the Boulder Highway. This restriction will be lifted when the RMP is completed in 2004. Every effort will be made to ensure that the leasing process is consistent with the Rocks Springs FO management decisions, as stipulated in the Green River RMP.

In 1994 a Memorandum of Understanding (MOU) (BLM MOU # WY920-94-79) was signed and activated between the Wyoming BLM and the State of Wyoming Oil and Gas Conservation Commission (WOGCC). In the MOU BLM and the WOGCC agreed to: develop and share information of common need; plan and implement oil and gas development in coordination with surface management issues; maintain a good faith effort to keep one another informed and advised of plans and actions which might effect each other; work in harmony to achieve the objectives of their policies and regulations; and that the Reservoir Management Team (Casper Field Office) will be the WOGCC's local point of contact for disbursement of correspondence related to the MOU. This agreement supplements oil and gas regulations and stipulations in the State of Wyoming.

2.8.2.3. Fluid Mineral Management Objectives and Restrictions Resulting From the Pinedale Anticline ROD

The Record of Decision (ROD) for the Pinedale Anticline Oil and Gas Development Project (July 2000) incorporated numerous management objectives and decisions affecting fluid mineral development operations within the Project area. While the ROD did not amend the 1988 Pinedale RMP, management decisions are currently governing development of the area, are included terms and conditions of leases and APDs, and are providing specific management actions for several affected management areas named in the ROD.

Management restrictions and limitations contained in *Pinedale Anticline ROD* that are common to all BLM-administered lands within the Pinedale FO are summarized below:

- Proposed and cumulative developments (wells, access roads, pipelines, centralized production facilities (CPF), compressors, etc.) will be reviewed at least annually within the context of the Adaptive Environmental Management (AEM) planning process. Monitoring will be developed to address both direct and cumulative impacts. All major road and pipeline plans may require review of the Transportation Planning Committee to ensure their location will result in the least impact.
- Prior to approving surface disturbing activities, site specific environmental analysis will be required;
- Where necessary, areas to be disturbed will require inventories or special studies to determine the extent of site-specific impacts and appropriate mitigation. Operators could be required to complete inventories or short-term special studies under guidelines provided by the BLM or as developed through the AEM process.
- In the event of substantial unanticipated environmental effects to listed, proposed or candidate species are observed, formal consultation with the USFWS will be initiated immediately in addition to cessation of all such operations; or if effects to paleontological values are observed, the operator will be required to immediately contact the BLM and the operator will be required to cease any operations that will result in destruction of or adverse impacts to these values.
- All proposals will be required to comply with the *Guidelines for Surface Disturbing Activities (*Appendix P)
- BLM will require each right-of-way, APD or other application to include a reclamation plan in conformance with the *Guidelines for Surface Disturbance Activities* (Section 3, Appendix P). BLM will require all above ground facilities to be painted with appropriate nonreflective standard environmental colors specified by the BLM.
- Low profile tanks will be required wherever visual sensitivity is an issue and wherever deemed appropriate to help maintain the basic characteristics of the landscape. Unless excluded in the APD, BLM will allow only low profile tanks north of the New Fork River and within the Lander Trail viewshed.
- BLM will require productive well locations and their access roads to be reclaimed by the fall or spring after the well has been drilled and brought on line.
- Best Management Practices (BMPs) will be required to control sediment for all construction sites, with more detailed plans being required for the New Fork and Green Rivers on sites within one mile of sites to control erosion, accomplish revegetation and restoration. (Appendix Q for examples of BMP considerations). Documentation of adequate monitoring is required by WDEQ.

- No well pads, access roads, or aboveground facilities will be allowed within 0.25 miles of a sage grouse lek.
- The placement of well pads, access roads or other above ground facilities will not be allowed within 825 feet of an active raptor nest, 1,000 feet of a ferruginous hawk nest , and 2,600 feet of a bald eagle nest. Wells that must be located closer than 2,600 feet (but will not allowed closer than 2,000 feet) are allowed under certain circumstances and conditions spelled out in the *Pinedale Anticline ROD.*
- To minimize visual impacts in the Visual Resource Management (VRM) Class I or III areas, authorization of well pads locations, new roads, CPFs, buried pipelines, etc will require the operator to demonstrate that the location and/or facilities have reasonably incorporated visual design considerations that will mitigate unnecessary visual impacts.
- Operators will be required to consider implementing CPFs, particularly in areas of sensitive resource values, to allow for additional well pads and reduced unnecessary impacts.
- BLM and WOGCC abandonment procedures will be followed by operators on each well based on approved reclamation plans. All surface equipment will be removed from each site and well pads areas will be recontoured and topsoil spread over the disturbed areas. Reseeding of all disturbed areas will be accomplished.
- A well pad density threshold is established for each of 9 specified Management Areas (see Tables 2.8 - 1 and 2.8 - 2 from the *Pinedale Anticline ROD).* If the threshold is reached, no additional well pads will be authorized (except for drainage) until additional environmental analysis has been completed examining the effects of development on resources and reasonable additional mitigation required.

In addition to the management decisions applicable to common areas, the *Pinedale Anticline ROD* also specified site-specific management decisions pertaining to nine Management Areas (MAs). The nine areas are as follows: the Lander Trail; Mesa Breaks; Unleased Federal Land; Sensitive Viewshed: Crucial Deer, Antelope, Sage Grouse Habitat; additional Crucial Sage Grouse Habitat; Ross Butte/Blue Rim Sensitive Soils, Plants and Raptors; Minimal Conflict Area; and Non-Federal Lands. The management decisions governing the mitigation of fluid minerals development activities in these nine MAs are located in Tables 2.8-1 and 2.8-2.

2.8.2.4. Natural Gas Management Decisions Specific to the Jonah Field II Natural Gas Project ROD

The Decision Record for the Jonah Field II Natural Gas Project covers a 29,200 acre area located within the Pinedale Anticline in south-central Sublette County, of which 27,280 acres are BLM-administered lands. The project increases well density locations to a maximum of 16 well locations for every 640-acre section the Jonah Field II project area, the project reduces development densities in other areas of the Pinedale Anticline. The ROD determined that the proposed actions are in conformance with the Approved Pinedale Resource Management Plan. The approval is conditioned upon the Operators implementing an operator-committed resource protection plan described in section 2 of EA. The principal mitigation measures required for the natural gas development activities in Jonah II are summarized below:

- Erosion prevention and control measures will be intensified if monitoring indicates that soil erosion is occurring at an accelerated rate, and new field studies will be conducted if necessary.
- The BLM will approve construction actions when frost depts. Exceed 6 inches;
- ADP and ROW stipulations will contain provisions to minimize disturbance area sizes by 1) coordinating with the Rock Springs Field Office; 2) encouraging the use of temporary drilling water pipelines and requiring lines be installed outside the winter season and within existing ROWs; and 3) locating water wells on locations that will minimize area requirements.
- Operators will be required to conduct water quality testing by October 1 of each year on shallow aquifers (<300 feet deep) to identify whether impacts from cross-auqifer mixing and/or gas condensate (particularly benzene) contaminants may be occurring. Also, Operators will be required to conduct complete water quality analyses after completing new water wells, and wells will require periodic water analyses. Any adverse changes will require corrective action.
- Operators are required to take special measures to store tank batteries , drain sumps and sludge holdings at compressor facilities, and contain treaters, dehydrators and other production facilities.
- Operators are required to notice and report any spill or leakage in accordance with BLM guidelines and regulations (BLM NTL3A).
- Operators are required to use directional drilling, consistent with lease terms, when drilling beneath areas set aside to protect sage grouse leks, and, when necessary, use low-profile tanks within 0.5 miles (or line of sight) of sage grouse leks.
- Operators must comply with Federal and state regulations when developing on state lands.
- Operators must notify BLM before implementing refracturing, workovers, and other routine well operations requiring more than 1 day of day-light operation from February 1 to July 31 to monitor and protect nesting raptors.
- Adaptive management data will be employed to adjust requirements in ADP and ROW application reviews.
- To protect cultural resources, road and pipeline ROWs will be approved only across the Sand Draw, Granite Wash, and Alkalai Draw buffers on a case-by-case basis after careful consideration of the need and the impacts of each proposed action; BLM reserves the right to deny when frost depths exceed 6 inches or where archeological features may be damaged.
- Transportation Planning will be coordinated with the Pinedale Anticline Project.

2.8.2.5. Surface Disturbance Restriction Decisions

The surface disturbance restrictions are necessary to protect certain sensitive resources and areas from adverse affects of surface-disturbing activities and human presence, and are inclusive of the various management actions developed in and analyzed for the approved RMP. These restrictions apply to all types of activities involving surface disturbance or human presence impacts and are applied in accordance with the guidelines described in the *Guidelines for Surface-Disturbing Activities* (Appendix P). The guidelines include, where applicable, proposals for waiver, exception, or modification, based on analysis for individual actions. This allows for situations where a surface-disturbing activity may actually benefit sensitive resources, and allows for those occasions when analysis determines that an activity will not affect those resources.

The *Guidelines for Surface-Disturbing Activities* are used, as appropriate, to condition development activities in all programs where surface-disturbing activities occur and where the objectives of the RMP include the protection of important resource values. On a case-by-case basis, activities will be conditioned by any one or more of the mitigation requirements, to avoid or minimize impacts to other important resource values and sensitive areas. Use restrictions (e.g., dates, distances) may be made more or less stringent depending upon the needs of specific situations. The restrictions identified under the various resource programs are complimentary to the standards in Appendix P and are not all-inclusive. They represent both actual requirements applicable to specific circumstances, and examples of requirements that will be considered and that may be applied, if necessary. Additional restrictions may be placed on surface-disturbing activities as necessary.

The mitigations identified in the *Guidelines for Surface-Disturbing Activities* are intended to provide a degree of protection to affected resources, not to unnecessarily restrict activities. The RMP provides the flexibility for modifications or exceptions to restrictions in specific circumstances where a restriction is determined not to apply or is not needed to achieve a desired objective.

Surface disturbance is characterized by the removal of vegetative cover and soil materials. Where actual excavation does not occur, activities may be allowed to occur with less stringent limitations provided that the objectives and purpose for the surface disturbance restrictions are met. Timber harvesting within 500 feet of streams or riparian areas and on slopes greater than 25 percent are examples where less stringent application of the standard mitigation guidelines (Appendix P) would apply. This would be applicable to those timber harvest activities, such as tree cutting, skidding, and slash disposal, that do not fully remove vegetative cover and soil materials. In the past, allowing these activities with a 100-foot streamside buffer distance and on slopes greater than 25 percent have proven effective. However, road construction or staging/loading areas for logging equipment would not meet the less stringent definition and would be subject to the standard requirements of 500 feet and 25 percent slope.

The mitigations prescribed for Federal mineral development on split estate lands (Federal mineral/nonFederal surface) apply only to the development of the Federal minerals. These mitigations do not dictate the surface owners' management of their lands. The mitigations present restrictions on only those surface activities conducted for purposes of developing the Federal minerals and that are permitted, licensed, or otherwise approved by the BLM.

When the BLM is considering issuing a mineral lease, the agency has a statutory responsibility under the *National Environmental Policy Act (NEPA)* to assess the potential environmental impacts of the Federal undertaking. It also has the statutory authority under the *Mineral Leasing Act of 1920*, the *Mineral Leasing Act for Acquired Lands*, and the *Federal Land Policy and Management Act of 1976 (FLPMA)* to take reasonable measures to avoid or minimize adverse environmental impacts that may result from Federally authorized mineral lease activities. This authority exists regardless of whether or not the surface is Federally owned.

The *Mineral Leasing Act of 1920*, the *Mineral Leasing Act for Acquired Lands*, and the *Federal Land Policy and Management Act of 1976* are not the only statutes that establish such authority. Other statutes that may be applicable include the *Clean Water Act*, the

Clean Air Act, the *National Historic Preservation Act*, the *Endangered Species Act of 1973*, the *Federal Coal Leasing Amendments Act of 1976,* and the *Surface Mining Control and Reclamation Act of 1977.* Moreover, the *Federal Onshore Oil and Gas Leasing Reform Act of 1987* specifically requires the BLM to regulate surface disturbance and reclamation on all leases.

Surface disturbance restrictions are contained in stipulations in all fluid mineral leases and vary according to the surface resource protection needs of the areas being leased. The stipulations limiting surface disturbance are included as a standard provision on all new oil and gas leases offered by the Pinedale Field Office. This stipulation would prevent surface disturbing activities , such as roads, pipelines or well pad construction within certain areas unless site-specific mitigation is proposed and approved, or a site-specific analysis indicates that the activity would not impact resources. The stipulation requires that surface disturbing activities would not occur:

- In areas with a surface slope in excess of 25 percent.
- In Class I and Class II VRM areas.
- Within 500 feet of surface water or riparian areas.
- Within one-quarter mile or visual horizon (whichever is closer) from a historical trail.
- During periods when soil material is saturated, frozen, or when watershed damage is likely to occur.

Necessary protection from surface-disturbing activities is provided for wintering wildlife on about 461,090 acres of crucial and noncrucial winter range (Table 2.8 – 3). Seasonal restrictions are incorporated into all land use authorizations where appropriate. This includes approximately 13,440 acres of noncrucial elk winter range in the Bench Corral area; approximately 3,400 acres of noncrucial elk winter range in the Miller Mountain area; and approximately 12,800 acres of noncrucial deer winter range in the Mesa area.

No surface occupancy will be allowed on elk feedgrounds (Appendix R). Exceptions may be allowed if analysis indicates that proposed activities will either benefit or cause no adverse impacts to the elk. Further public input will be required for exceptions that are not designed to specifically benefit elk.

No activity or surface disturbance will be allowed in elk calving areas during periods of use, usually between May 1 and June 30 (Table 2.8 - 3 and Appendix P).

Sage grouse nesting areas are protected in accordance with the Wyoming BLM mitigation guidelines (Table 2.8 - 3 and Appendix P). Surface occupancy or use, including but not limited to the drilling of wells, the construction of well pads, roads, pipelines, or other types of rights-of-way, and/or the installation of permanent or high profile structures (buildings, storage tanks, overhead powerlines, etc.) within 1/4 mile of a sage grouse lek (strutting ground) are restricted or prohibited, unless the operator and Authorized Officer arrive at an acceptable plan to mitigate anticipated impacts. Activities are generally restricted to existing roads and trails. Other activities may be allowed if environmental analysis indicates that nesting sage grouse concentrations will not be adversely affected. Activity between the hours of 12 midnight and 9:00 a.m. is not allowed within approximately one half mile of leks (e.g., during strutting season). (amended April 9, 1993)

Seasonal restrictions apply to active raptor nests. Priority for further inventory of raptor nest locations will be given to areas where activities and surface disturbance are proposed.

No surface disturbance is allowed within 500 feet of riparian habitat, wetland, and(or) live water unless a high potential for successful rehabilitation exists and(or) impacts will be temporary in nature pursuant to guidelines in Appendix P

No surface disturbance will be allowed on the Upper Green River Special Recreation Management Area (UGRSRMA). The RMP provides for preparation of a recreation management plan for the UGRSRMA, which has not been completed due to lack of staff and budgetary resources.

No surface disturbance will be allowed within one-quarter mile or the visual horizon (whichever is closer) of contributing segments of historic trails.

Waste disposal facilities (e.g., drilling fluid pits, solid waste, and sanitary facilities) are not authorized on floodplains, wetlands, and related riparian zones (Table 2.8 – 3).

Surface disturbance is minimized in crucial watersheds, such as Soap Holes Basin and Tip Top, to reduce soil erosion and sediment and salinity contributions to the Green River

Basin water system (Table 2.8 - 3). Surface-disturbing activities have been and will continue to be appropriately restricted in accordance with the standard mitigation guidelines and standard practices applied to surface-disturbing activities (Appendices A-1 and A-3).

No surface occupancy is allowed on cultural sites 48SU301, 48SU350, and 48LN300, and on other developed and semi-developed recreation sites. No exceptions will be allowed without further public input. The NSO established for cultural resource site 48SU301 was established on a 160 aliquot part subdivision so that it could be readily and legally described in land description terms. The intent of the NSO is to prohibit surface occupancy on the physical cultural resource properties of the site. It is also intended to prohibit surface occupancy within the immediate viewshed of the various site properties (i.e., that portion of the viewshed that occurs within the NSP boundary). It was not intended to prohibit surface occupancy in those portions of the NSO that occur outside the viewshed and that contain no cultural properties. December 7, 1995

Surface disturbance is not allowed within one-quarter mile of developed and semi-developed recreation sites unless activities are determined to be compatible with recreation objectives for the area.

No surface occupancy will be allowed in the Rock Creek drainage within the Rock Creek Area of Critical Environmental Concern (ACEC) approximately 4,200 acres. The only exceptions are activities proposed to benefit the Colorado River cutthroat trout habitat. No exceptions will be allowed without further public input.

Surface disturbance is not allowed within 1,000 feet of streams and on slopes of 25 percent or greater within the Beaver Creek ACEC.

2.8.2.6. Geophysical Exploration

Geophysical notices of intent are evaluated on a case-by-case basis. All acreage in the planning area is subject to various appropriate limitations (e.g., vehicle use restrictions), approximately 517,170 acres subject to seasonal limitations. In addition, the use of explosive charges may not be allowed in any area if analysis determines that unacceptable adverse impacts would occur.

Generally, all authorizations will be issued with appropriate application of surface disturbance mitigation requirements as presented in Appendix P.

For example, these No Surface Occupancy Stipulations are in accordance with the *Guidelines for Surface Disturbing Activities.(Appendix P)* These stipulations are applicable to all geophysical exploration methods inclusive of viberszing, polter shots, surface explosives, and shot holes and specifically include:

- No surface disturbance on slopes in excess of 25 percent.
- No surface disturbance within 500 feet of surface water and/or ripariaion areas.
- No surface disturbance within an important scenic area (Classes I and II of Visual Resource Management Areas).
- No surface disturbance beyond 200 feet from the transportation corridor.
- No surface disturbance on frozen or saturated ground, which could lead to watershed damage.
- No surface disturbance within one-quarter mile or the visual horizon of historic trails.

An environmental assessment will be completed to ensure that surface disturbances and environmental impacts are in compliance with NEPA and vegetation and wildlife habitats are minimized and mitigated. Vehicle exploration grid preferences, as established by the Pinedale FO for vibercising, will form the standard pattern for future exploration.

All BLM oil and gas leases will be required to receive a Lease Notice Number 1.

Specific limitations include:

- Approximately 7,636 acres in the Scab Creek area will be closed to geophysical activities.
- Areas closed to ORV use will also be closed to vehicle use for geophysical activities.
- In the Beaver Creek Area of Critical Environmental Concern (ACEC), geophysical vehicles will be restricted to existing roads and trails.
- Geophysical vehicle travel through developed and semi-developed recreation sites will be restricted to established roads and trails.
- Geophysical activities in the remaining NSO areas (mostly cultural sites and elk feedgrounds) will be evaluated on a case-by-case basis and may be restricted if unacceptable impacts would occur to other resources (e.g., water quality, cultural, wildlife, recreation, and visual resource values).

Once a lease expires, any additional stipulations attached to the lease permit are null and void.

Computer Aided Technology will continue to be used as a management decision-making tool to identify impacts to sensitive surface sites.

2.8.2.7. Oil and Gas Leasing and Geophysical Activities in the Rock Creek Area of Critical Environmental Concern and Surrounding Area

The Rock Creek ACEC and surrounding area (about 17,000 acres) is available for consideration for oil and gas leasing with appropriate stipulations, following the completion of an activity plan and associated environmental analysis.

That portion of the Rock Creek ACEC within the Rock Creek watershed boundary has been and will continue to be leased with a no surface occupancy (NSO) stipulation for protection of the pure strain of Colorado River cutthroat trout in Rock Creek (see Appendix P).

Leasing guidelines and objectives in the remaining parts of the Rock Creek ACEC and portions of the adjacent Deadline Ridge-Graphite Hollow crucial elk winter range are to be established in a site-specific minerals/wildlife management plan (activity plan) subject to full NEPA documentation and compliances. This plan will include an evaluation of the ongoing elk habitat use study and compilation of geologic data.

The Rock Creek ACEC plan also includes the following direction:

- Oil and gas leasing direction, regarding related activities in the evaluation area east of the Rock Creek ACEC, will be designed to ensure continued elk winter use in the Deadline Ridge-Graphite Hollow area. Oil and gas development will be allowed if determined to be compatible with continued elk use of the crucial winter range. No substantial adverse impacts to this elk habitat will be allowed.
- Oil and gas leasing direction, regarding related activities in the evaluation area west of the Rock Creek ACEC, will be guided by the RMP multiple use guidelines and objectives. Evaluation may allow for some development on this portion of the crucial elk winter range, as long as RMP planning objectives are met.
- Upon completion of the Deadline Ridge-Graphite Hollow wildlife/leasing study and activity plan the BLM identified suitable areas for surface occupancy based on the

previously mentioned minerals leasing guidelines and objectives. Any requests for relief from leasing restrictions that are in conflict with these guidelines and objectives will be analyzed on an individual basis. Based on the analysis, conflicting actions have been denied and a plan amendment was initiated to modify the plan objectives.

- Upon completion of the Deadline Ridge-Graphite Hollow activity plan, large contiguous areas may be offered for lease with the NSO stipulation. These areas may only be accessed through directional drilling. The NSO stipulation would be used, rather than a no lease provision, under the assumption that industry is the best judge of whether technology would enable access to the oil and gas resources in compliance with the terms of the lease.
- Leases are approved with the NSO stipulation where the area is characterized by steep, and in many cases unstable slopes, with stream/riparian zones "filling" the valley bottoms.
- Leases are approved with the NSO stipulation where deep gas is of primary interest in the evaluation area. Drilling in these reserves may require more than a year's time, that renders seasonal restrictions inadequate to mitigate impacts on wildlife resources. The objective of the stipulation is to enable the lessee to locate potential areas for deep drilling access while protecting wildlife values. Input from industry, as well as from concerned public groups or individuals, is sought prior to this evaluation.
- Leasing with an NSO restriction may occur prior to completion of the evaluation in those areas where oil or gas development is contemplated.
- The portion of the Rock Creek watershed boundary within the Rock Creek ACEC (4,200 acres) is open only to portable geophysical activities. Activities in the remainder of the Rock Creek ACEC (outside the drainage, approximately 1,000 acres) will be evaluated on a case-by-case basis and may be restricted if analysis determines that restrictions are necessary.

2.8.2.8. Other Leasable Minerals

Should interest in other leasable minerals materialize in the future, leasing will be considered on a case-by-case basis, and the RMP will be amended as appropriate and necessary. The same surface-disturbance restrictions presented in Appendix P will be used in analyzing leasing proposals and determining the issuance of any leases (e.g., geothermal steam, coal, sodium, oil shale, phosphate).

The existing withdrawals for phosphate, coal, and oil shale will be revoked. These mineral resources no longer need such protection as they are now made available for development under mineral leasing regulations. Mineral leases, other than oil and gas, will be subject to the same resource constraints as established for other surface-disturbing activities.

2.8.2.9. Locatable Minerals

With the exception of withdrawn lands, the planning area will be open to mineral location pursuant to the provisions of the Mining Law of 1872 and 43 CFR 3809. Areas identified as needing total protection from locatable mineral activities will be closed to mineral location and considered for withdrawal. For example, if analysis of the Rock Creek drainage portion of the Rock Creek ACEC indicates that this level of protection is necessary, a withdrawal from mineral location will be initiated on the area (approximately 4,200 acres).

Surface-disturbing activities on mining claims require a notice submitted to BLM for a cumulative surface disturbance of 5 acres or less and a plan of operations for disturbances of more than 5 acres as outlined in 43 CFR 3809. The general purpose of the stipulations in 43 CFR 3809 is to prevent unnecessary and undue degradation of public lands by operation authorized by the mining laws. Anyone intending to develop mineral resources on public lands in the Pinedale Field Office must prevent unnecessary or undue degradation of the land and reclaim areas, as well as provide for maximum possible coordination with appropriate State agencies to avoid duplication and to ensure that operators prevent unnecessary or undue degradation of public lands.

A plan of operation has to be submitted to the Pinedale Field Office and approval has to be obtained before beginning operations greater than causal use. A plan of operations for any bulk sampling in which 1,000 tons or more of presumed ore testing is removed must be submitted. A plan of operation must be submitted for any operations causing surface disturbances greater than causal use in National Wild and Scenic River Systems; Areas of Critical Environmental Concern; areas designated as part of the National Wilderness Preservation System administered by the BLM; areas designated as closed to off-road vehicle use; any lands or waters known to contain Federally proposed or listed threatened or endangered species or their proposed or designated habitat, unless BLM allows for other action under a formal lad use plan or threatened or endangered species recovery plan; and National Monuments and National Conservation Areas administered by the BLM.

2.8.2.10. Salable Minerals

Applications for mineral sales (e.g., sand, gravel) will be analyzed and processed on a case-by-case basis and appropriate surface disturbance mitigation requirements will be included in permits (Appendices C and P). The established common use area in sections 15, 22, 27, and 34, T. 27 N., R. 115 W., will remain available for development. However, those portions of the common use area in sections 15 and 22 will be managed under the Interim Management Policy and Guidelines for Lands Under Wilderness Review until Congress acts upon the wilderness recommendations.

The Pinedale FO has prepared the following stipulations for the extraction of salable minerals:

- Closures for critical big game winter habitat will occur between November 15 to May 1.
- Closures for sage grouse nesting will occur between May 1 to July 31.
- Stock piling of topsoil removed for drill pad construction or gravel mining operations are required.
- Documentation of the amounts of sand and gravel mine load counts is required.
- The reclamation of mined-out areas including the returning of slopes to a 3:1 contour replacement of topsoil and re-seeding of disturbed areas is required.
- The harvesting of boulders is allowed within the 50-foot rights-of-way of existing roads.
- All debris and trash have to be removed.
- Operations must conform to mitigation requirements EAs and/or Plans of Operation as submitted to the Pinedale FO.
- All operations will be suspended immediately upon the discovery of any paleontological or archaeological artifacts. Any discovery must be reported the resident BLM archaeologist who will take appropriate action to evaluate the site.
- All rejected material must be placed in the pit-bottom before re-contouring of the land.
- No unnecessary denigration or undue degrading of the land is permitted.
- Minerals extraction is restricted to areas marked stakes.
- The purchaser of the extractable minerals shall have a copy of a sales contract available at the pit site.
- The permittee shall comply with all Federal and State laws.

Regular field monitoring of salable mineral permit areas will be conducted to ensure permit compliance.

2.8.2.11. Geological Hazards

No major geological hazards are found in the Pinedale Field Office.

2.9. OFF-HIGHWAY VEHICLE USE

2.9.1. MANAGEMENT OBJECTIVES

The objective of off-highway vehicle (OHV) management will continue to be to allow the legitimate use of off-highway vehicles where possible (43 CFR 8340.0-5), and provide adequate protection to identified sensitive resources. The standards for healthy public rangelands, described in Appendix D, apply.

2.9.2. MANAGEMENT ACTIONS

The entire planning area is designated as either "open," "closed," or "limited" to OHV uses. The majority of the area is designated as "limited" (i.e., having travel limited to existing roads and trails, except for over-the-snow vehicles).

The Bench Corral elk winter range is closed to all OHV use, including over-the-snow vehicles, from November 15 through April 30. Lands around the Franz, Finnegan, Scab Creek, Fall Creek, and North Piney feedgrounds is also closed to OHV use and unauthorized human presence from November 15 through April 30. (Table 2.9 – 1)

The Deer Hills, Oil Field, and Mesa deer and antelope winter ranges have a winter travel limitation restricting vehicle travel from November 15 through April 30 on an as-needed basis. These seasonal limitations will be implemented in cooperation with the WGFD during severe winters or periods of disturbance of the wildlife wintering in these areas of concern.

About 120 acres in the Holden Hill area will be closed to all OHV use.

OHV open use areas will be provided to allow for recreational OHV uses. The two initial areas (Mount Airy and Big Piney) have been established adjacent to the towns of Pinedale and Big Piney to provide intensive use areas for OHVs. An activity plan will be prepared and precise boundaries for the areas will be determined in the OHV course of preparing and analyzing the plan.

The Desert General Use area will remain open to generalized OHV uses. This is an area of over 224,000 contiguous acres of public land. The Desert Open Area will be monitored periodically to determine if unacceptable impact levels are occurring or being approached, which will require that OHV use be re-evaluated and limited accordingly.

In general, OHV use will be monitored periodically to determine actual use and public demands. Monitoring of high density roaded areas will be conducted as described in the section on Access Management.

2.10. PALEONTOLOGY

2.10.1. MANAGEMENT OBJECTIVES

Natural history and paleontological resource values will continue to be managed to protect and preserve representative samples of these values that are present in the planning area. The standards for healthy public rangelands, described in Appendix D, apply.

2.10.2. MANAGEMENT ACTIONS

Paleontological sites are protected through the use of surface and subsurface protection stipulations and discretionary management authority. Any actions to close or restrict areas for fossil protection are evaluated on a case-by-case basis. All collection of vertebrate fossils requires a paleontological collection permit.

Collection of invertebrates and plant fossils "of significant interest" requires a collection permit from BLM. Permits are also required for mapping and reconnaissance work as well as for collection and(or) evaluation work.

As areas of unique natural history or particular natural interest are identified, they will be nominated for designation as National Natural Landmarks, Research Natural Areas, or

ACEC and managed for protection of their unique values. Interpretation of the natural features and public use will be emphasized.

BLM will identify appropriate measures and scientific, educational and recreational use opportunities for paleontological localities.

The Probable Fossil Yield Classification (PFYC) system developed by the Paleontological Center of Excellence and Region 2 (USFS) as modified by the Regional Paleontologist, Wyoming BLM in 2002 is used as standards for the classification of probable paleontological resources.

Inventories will be conducted on a case-by-case basis for each proposed surface-disturbing activity to ensure maintenance or integrity of paleontological values. These include the following: The operator shall be responsible for informing all persons associated with this project that they shall be subject to prosecution for damaging, altering, excavating or removing any archaeological, historical, or vertebrate fossil objects or site. If archaeological, historical, or vertebrate fossil materials are discovered, the operator shall suspend all operations that further disturb such materials and immediately contact the authorized officer. Operations shall not resume until written authorization to proceed is issued by the authorized officer. Within five working days, the authorized officer will evaluate the discovery and inform the operator of actions that will be necessary to prevent loss of significant cultural or scientific values. The operator shall be responsible for the cost of any mitigation required by the authorized officer. The authorized officer will provide technical and procedural guidelines for the conduct of mitigation. Upon verification from the authorized officer that the required mitigation has been completed, the operator shall be allowed to resume operations.

The Pinedale-Boulder Glacial area has been proposed for designation as a National Natural Landmark (NNL). The area will be studied in conjunction with the Forest Service to determine applicability of the designation. The site will be managed to protect the unique geological and ecological features and provide for public interpretation of these features.

2.11. RECREATION RESOURCES

2.11.1. MANAGEMENT OBJECTIVES

Recreation values will continue to be managed to accommodate existing uses, prevent or mitigate environmental degradation resulting from recreation and other uses, and provide for the anticipated recreation uses and use levels in the resource area. The standards for healthy public rangelands, described in Appendix D, apply.

2.11.2. MANAGEMENT ACTIONS

Recreation management emphasis will be placed on designated recreation management areas including Scab Creek, the Green and New Fork rivers, Oregon Trail routes, and Boulder Lake. Recreation management for the above referred areas, as well as Oregon Trail routes, will emphasize maintaining or improving the quality of the sites and the recreation experience.

Public lands along the Green and New Fork rivers will be managed to provide fishing and float boating opportunities. Necessary facilities will be developed to provide for protection of users and the resources. Also special management attention is given to the remaining scattered parcels of BLM land along the Snake River. The residents of Teton County are utilizing these lands and the surrounding counties for high quality recreational activities, including hiking, horseback riding, cross country skiing, fishing, boating, picnicking, and watching wildlife. The Snake River RMP is being completed by the Pinedale Field Office to provide management direction for these lands.

Recreation facilities will be installed where needed to accommodate the anticipated recreation uses and use levels and to provide for adequate public health and safety.

The order of priority for recreation management will be: 1) Congressionally designated areas, 2) major rivers and lakes where BLM has clear jurisdiction, 3) areas with outstanding recreation resource values not already provided for in the area, and 4) areas where the recreation capacity is regularly exceeded, threatening other important resource values.

Cooperative recreation projects and those with contributed funding will also be given priority for development if they are in conformance with established recreation objectives and priorities.

Withdrawals of BLM administered lands from exploration and development of locatable minerals will be pursued, as necessary, on developed and semi-developed recreation sites. Currently about 585 acres, have been withdrawn for recreational use.

Boulder Lake will be established as a special recreation management area and related recreation facilities will be developed to improve public access and use opportunities.

A maximum 14-day camping limit is enforced throughout the planning area. Areas requiring shorter limits will be posted. Written authorizations will be required for longer periods. A temporary, no overnight camping stipulation may be imposed in an emergency.

Where applicable, recreation facilities will be developed and managed in a manner that will maintain, restore, and improve riparian values.

Special recreation permits commercial recreation uses and major competitive recreation events will include mitigations developed to ensure the protection of other resources in accordance with objectives of all resource values involved.

2.12. SOILS AND WATERSHED

2.12.1. MANAGEMENT OBJECTIVES

Management objectives will continue to be focused on maintaining or enhancing the quality of surface and ground water. Watersheds will be managed to maintain or improve channel stability and overall watershed conditions.

Soil conservation will be enhanced through managing for maintenance of soil productivity and stability, and to allow water infiltration to provide for optimal plant growth. (*Standards for healthy public rangelands, Appendix D, amended April 28, 1998*).

2.12.2. MANAGEMENT ACTIONS

Management actions will continue to emphasize the reduction of soil erosion and sediment and salinity contributions to the Green River Basin water system. Restrictions applied to surface-disturbing activities to help achieve this are found in Appendix C. Of particular importance will be those areas with highly saline soils such as the Soap Holes Basin and crucial watersheds where surface disturbance will be minimized. These crucial watersheds are generally found within the boundaries of the ground water recharge zones.

Corrective measures to be applied where unsatisfactory watershed conditions are identified will be developed and implemented through activity plans (e.g., watershed, habitat, allotment, or timber management plans). Such measures will also be implemented through stipulations attached to permits, leases, and other authorizations.

The *Wyoming BLM Standard Mitigation Guidelines for Surface-Disturbing Activities* (Appendix P) and the *BLM Guidelines for Surface-Disturbing Activities* (Appendix C) are used to control nonpoint sources of water pollution in watersheds and reflect Best Management Practices (BMPs) relative to the Clean Water Act of 1972, as amended. As other BMPs for nonpoint sources of water pollution are developed, they will be incorporated into the guidance for this plan where they conform with the RMP objectives.

Projects proposed on BLM-administered lands are, and will continue to be, evaluated on a case-by-case basis for affects on soil and water resources. Soil management practices are applied on a site-specific basis using soil survey data, and will be related to the soil characteristics such as the steepness of slopes, the length of slope, and soil chemistry and composition.

Examples of management practices being applied throughout the resource area include seasonal closures due to saturated soil conditions and the standard practices applied to surface-disturbing activities (Appendices C and P). At certain times of the year, land uses will be precluded until soil moisture is such that the use or activity will not result in degradation of the soil resource and watershed condition. These closures occur predominately in the spring and autumn.

A monitoring program for specific surface waters will be continued to identify trends on water quality. Public drinking water at recreation sites will also be protected and monitored to comply with EPA safe-drinking water standards.

A Level II ground water study of the Riley Ridge/LaBarge area have been completed to define the ground water resource and to determine what additional ground water monitoring and protective measures are necessary in regard to subsurface activities conducted in the area (e.g., oil and gas drilling activities).

Ground water protection will continue to be assured by applying the procedures described in Appendix Q. Special precautions are taken to ensure protection of ground water quality when surface disturbance is contemplated on ground water recharge zones. Criteria for determining depth of fresh water are found in Appendices O and Q.

An activity plan for reducing erosion and channel degradation will be prepared for the Tip Top watershed. Specific actions could include road maintenance, recontouring, and reseeding of disturbed sites to help achieve soil stabilization.

A watershed/recreation plan will be prepared on the Stuart Point-Mount Airy area for reducing sedimentation while still allowing off-road vehicle (ORV) use. (A more detailed description of management decisions for this area can be found in the ORV section).

All actions will comply with *Executive Orders 11988 Floodplain Management and 11990 Protection of Wetlands*, the Clean Water Act, and the State of Wyoming Department of Environmental Quality water quality standards.

2.13. TRANSPORTATION AND ACCESS

2.13.1. MANAGEMENT OBJECTIVES

The objective for access management in the Pinedale FO will be to provide suitable public access to BLM-administered public lands. This may include acquiring new access where needed, maintaining existing access and expanding existing access facilities, or abandoning and closing access where it is not compatible with resource values and objectives. (*Standards for healthy public rangelands, Appendix D, amended April 28, 1998).*

On June 25, 2002 Instructional Memorandum No. 2002-196 was issued by the Assistant Director, Minerals, Realty, and Resources Protection. In this memorandum new guidance on ROW corridor and ROW Use Area planning and designation and the consideration of energy related and other ROWs as part of the BLM Land Use Planning process was provided.

The overall objective is to continue to make BLM-administered lands available for needed ROWs where consistent with national, state, and local plans, and use ROWs in common to minimize environmental impacts and proliferation of separate ROWs.

It is required of BLM to ensure that there is sufficient means to develop energy where authorizations require a ROW (e.g. wind energy) and transport energy supplies in an effective manner (e.g., oil and as pipelines and electric transmission lines), while maintaining current environmental standards and good stewardship principles.

2.13.2. MANAGEMENT ACTIONS

All land use plans must assess the impacts of land use decisions on the current and potential ROW corridors and ROW Use Areas and the authorization of energy related and other ROWs within land affected by the plan.

The need for ROW corridors, ROW Use Areas and the effects of land use plan decisions on energy related POWs must be factored into all of the steps of the land use planning process.

Each land use plan should include the following to the extent reasonable and appropriate:

1) Identify existing and potential corridors.

2) Identify existing and potential ROW development sites such as energy development areas (e.g., wind energy sites) and communication sites.

3) Describe likely developments of potential corridors and other ROW sites as a basis for impact assessment and the development of the stipulations or conditions of use.

4) Describe limitations on other uses in the potential corridors or at potential ROW development sites, that would be necessary to maintain the ROW and corridor values.

5) Describe corridor and ROW development area selection criteria, including goals and objectives for the areas identified.

6) Describe any adverse effects on the distribution or production of energy supplies if the decision is inconsistent with authorizing energy related facilities.

7) Describe reasonable alternatives to a proposed action having adverse energy effects and the anticipated effects of such alternatives on the production of energy.

Access across private lands will be pursued as needed through a variety of methods, including but not limited to purchase of rights-of-way or easements, land exchange, reciprocal rights-of-way, and other statutory authorities. (*Refer to USDI 1985b for a description of specific access acquisition procedures.*) Table 2.13 - 1 shows general locations of possible access routes or areas where legal access is needed. Specific routes and acquisition procedures for securing access will be determined through route analyses and environmental analyses as part of specific project and activity planning. Where appropriate, land exchanges or cooperative agreements will be considered and used to provide access needs.

A detailed evaluation and prioritization of high-density *roaded areas* in the planning area will be completed to determine needs for specific road closures and(or) rehabilitation. Priority evaluation areas include the Red Canyon, Red Castle Creek, and Fish Creek areas, as well as oil and gas fields in the southwestern portion of the resource area. Some existing roads may be closed except for administrative purposes. Specific mitigation measures and design requirements for roads will be developed through environmental analyses as part of specific project or activity planning. Proliferation of roads will be managed.

Access closure, abandonment, and acquisition will be considered and established through activity planning and environmental analysis processes. Road or trail closure and abandonment will be based on desired road or trail densities; demands for new roads; closure methods (e.g., abandonment and rehabilitation, closures by signing, temporary or seasonal closures); type of access needed; resource development or protection needs; and existing uses.

2.14. VEGETATION

2.14.1. MANAGEMENT OBJECTIVES

Vegetation will continue to be managed to maintain or improve ecological range condition, and to maintain or increase forage for livestock grazing, while providing for the maintenance or improvement of wildlife habitat, watershed values, and riparian areas, (*Standards for healthy public rangelands*, Appendix D, amended April 28, 1998).

2.14.2. MANAGEMENT ACTIONS

One Vegetation Management Project has been completed on (500 + more than 500 acres) in the Chain Lake Allotment.

Vegetation manipulations in I allotments are financed by BLM and other agency resources when available. BLM range improvement monies will not be used to finance vegetation manipulations in M allotments until all the range improvements are accomplished in I category allotments. The vegetation manipulations in M category allotments could be financed by other sources such as permittees, other agencies, or grazing boards.

Prescribed fire is the preferred method of vegetation manipulation for the conversion of brushland to grassland. A Wildfire occurring in areas with a fire prescription will be allowed to burn as long as it remains within the fire prescriptions and meets land use objectives for large burns. Other vegetation manipulation methods, including chemical and/or mechanical methods, will be considered on a case-by-case basis.

2.14.2.1. Noxious Weeds

Noxious weed invasion contributes to the loss of rangeland productivity, increased soil erosion, reduced species and structural diversity, loss of wildlife habitat, and in some instances, is hazardous to human health and welfare, as emphasized in the *Federal Noxious Weed Act" (Public Law 93-629)* and the accompanying Executive Order 13112 (Appendix S) Noxious weeds will be controlled through continuation of the existing noxious weed extermination program being conducted within the planning area. The protocols for noxious weed control are documented in the *Supplement to the Northwest Area Weed Control Program EIS and ROD (USDI 1987a)*.(Appendix T) Grazing and fire management, as well as chemical, mechanical, and biological control methods are used as part of an integrated weed management program. These methods are subject to site-specific determinations of appropriate techniques.

2.14.2.2. Special Status Plant Species

Section 68.40 of the BLM Manual sets the guidelines for special status plant species (Bureau-sensitive plant species). These selected species receive priority attention for inventories, research, monitoring, and for management decisions regarding land-disturbing activities. Consultation with Federal, State, and non-government agencies help direct the plants' protection and management. The BLM performs special status plant surveys before any land exchanges, range and wildlife projects, other surface-disturbing activities, or proposed mining operations take place.

2.15. VISUAL RESOURCES

2.15.1. MANAGEMENT OBJECTIVES

The objective of visual resource management (VRM) will be to maintain overall integrity of visual resources while allowing for modification and changes to occur to meet other resource objectives, *(amended April 28, 1998)* The four Visual Resource Management (VRM) classes (I, II, III, and IV) set standards for planning, designing, and evaluating projects by identifying various permissible levels of landscape alteration while protecting overall regional scenic quality. The scenic quality of an area is a measure of its visual appeal. The VRM classes range from very limited activity (Class I) to activity allowing major landscape modifications (Class IV).

2.15.2. MANAGEMENT ACTIONS

VRM classes have been established in line with overall resource management objectives of the approved Pinedale RMP. Table 2.15 - 1 shows the classification acreages. These are subject to change and further definition as more inventories and evaluations are conducted. VRMs in WSAs will be managed as VRM Class I in accordance with BLM policy outlined in *Instructional Memorandum No. 2000-096) (Appendix U)*. A program has been initiated to improve the visual quality of oil development facilities in the planning area by working with the companies to use various concepts to reduce the visual impact of existing facilities.

Projects of all types within established VRM class areas will generally be required to conform with the objectives and characteristics of the effective classification, or the project will be modified in order to meet the VRM class objective. Short-term modifications in portions of visual class areas may be approved if a site specific NEPA analysis determines that impacts would be acceptable or can be mitigated.

The VRM class areas will be monitored periodically for cumulative impacts, that may potentially conflict with their classifications.

2.16. WATER QUALITY AND RIPARIAN

2.16.1. MANAGEMENT OBJECTIVES

Management objectives for riparian areas will continued to focus on maintaining, improving, or restoring riparian values to provide enhanced forage, habitat, and stream quality. *(Standards for healthy public rangelands, Appendix D, amended April 28, 1998)*

2.16.2. MANAGEMENT ACTIONS

Riparian management is an integral part of all resources and related management programs. Activities that affect or are affected by riparian values, will take into account the riparian objectives and direction. Resource values and uses that affect or are affected by riparian values include: wildlife and fisheries habitat, forest resources, livestock grazing, ORV use, visual resources, cultural and historical resources, minerals exploration and development activities, lands and realty activities, watershed and soils resources, recreation uses, fire management, and access.

All surface disturbing activities are required to adopt design strategies that serve to reduce erosion and maintain or improve water quality. The area within 500 feet of wetlands, riparian areas, and 100-year flood plains, and within 100 feet of the edge of the inner gorge of intermittent and large ephemeral drainages are avoidance areas for surface disturbing activities, and exclusion areas for new permanent facilities. Proposals for linear crossings in these areas are considered on a case-by-case basis.

Riparian exclosures are required to be developed and/or maintained, and exclosure plans implemented. Riparian exclosures are used to protect degraded riparian habitat from further impacts associated with livestock grazing and to ensure reclamation of vegetation communities and ecological processes. Exclosures are closed to livestock grazing and AUMs in these exclosures are not available for livestock use.

Colorado River cutthroat trout habitat is given priority for riparian management. Management actions may include reductions in livestock numbers, adjustment in grazing distribution patterns, fencing, herding, livestock conversions, etc. Unallotted public lands containing riparian areas will be managed according to the same objective, with emphasis on wildlife and watershed objectives, but not necessarily to the exclusion of livestock uses.

2.17. WILD HORSES

All wild horses have been removed from the resource area consistent with the 1988 RMP planning direction.

2.18. WILDLIFE AND FISHERIES

2.18.1. MANAGEMENT OBJECTIVES

To the extent practicable, wildlife habitat management in the Pinedale FO will be oriented toward the maintenance of fish and wildlife habitats to support populations at levels coordinated with Wyoming Game and Fish Department planning objective levels. Activity planning will emphasize habitat enhancement and protection. Changes within Wyoming Game and Fish Department (WGFD) planning objective levels will be considered, based on habitat capability and availability. (*Standards for healthy public rangelands, Appendix D, amended April 28, 1998)*

Federal agencies are required to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of species or their critical habitat listed as threatened or endangered under the *Endangered Species Act (ESA).* The ESA requires the BLM and other Federal agencies to consult with the FWS to determine if their actions may affect any listed or proposed species and to document their determinations in a Biological Assessment (see Appendix D). Land use decisions are implemented with appropriate conservation measures or with reasonable and prudent alternatives to avoid jeopardizing any species or habitat.

Wildlife habitat activity planning will include other species as well as Federally listed threatened and endangered species and the Colorado River cutthroat trout.

In March 1990, an Umbrella Memorandum Of Understanding (MOU) between the Wyoming Game and Fish Department (WGFD) and USDI BLM Wyoming for Management of the Fish and Wildlife Resources on the Public Lands was signed. The purpose of the MOU was for the two agencies to work together to benefit all wildlife in Wyoming by cooperating in planning, and sharing data among other efforts.

The Wyoming BLM developed a Sensitive Species Policy and List in April 9, 2002 as a reaction to declining wildlife and plant species populations caused by a loss of habitat from the existing landscape. This policy underlies all management decisions made in the Pinedale Field Office pertaining to sensitive, threatened and endangered species. It is not the intent of the policy and list to establish rangewide species evaluation and tracking. These functions are performed by other entities (e.g., Wyoming Game and Fish Department's Species Watch List, and their Non-Game Bird and Mammal Plan; Wyoming Natural Diversity Databases' [WYNDD] List of Plant and Animal Species of Special Concern: etc.).

2.18.2. MANAGEMENT ACTIONS

Sensitive habitats within the Pinedale Field Office include, but are not limited to, crucial winter habitat, birthing areas, nesting areas, and sensitive fisheries. These habitats would be maintained and improved by reducing habitat loss or alteration and by applying appropriate distance, seasonal limitations, and mitigation standards to all appropriate activities.

Seasonal limitations for wildlife habitat were developed to protect sensitive wildlife areas from development and/or disruptive activities during crucial times in a wildlife species' life cycle, such as nesting, birthing, and wintering. Wildlife seasonal stipulations are developed consistent with statewide dates, but are not intended to close an area to development, but rather protect wildlife species if weather or other habitat needs dictate that it is necessary. The BLM may grant exceptions to seasonal limitations if the wildlife biologist, in consultation with the WGFD, is of the opinion that granting an exception will not jeopardize the population being protected. Seasonal limitations are shown in Table 2.18 - 1.

Some species of wildlife require additional measures of protection in order to reduce possible impacts to the species and preserve important habitat for continued species use and viability. Controlled Surface Use (CSU) and No Surface Occupancy (NSO) are two stipulations BLM uses for this purpose. CSU is a limitation where surface occupancy or use is restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts. This limitation is used for operating guidance, and not as a substitute for the NSO or timing limitation stipulations. CSU limitations apply only to sage grouse breeding grounds (leks) and their ¼ mile protection buffer.

As a Federal agency responsible for public lands, the BLM coordinates both formally and informally with local, State and other Federal entities, as well as the general public. Specific to wildlife management coordination, the BLM has entered into a *Memorandum of Understanding* (MOU) with the U.S. Department of Agriculture Animal and Plant Health Inspection Service. Other MOU have been developed with the WGFD. These MOUs form the basis of communication and duties between both agencies so as to manage wildlife in a consistent, sound manner.

Another MOU with APHIS-WS reflects agreement by both parties that APHIS-WS will have total operational control over animal damage control activities on the public lands. BLM's role is that of information input and reviewer only.

The BLM maintains wildlife habitat management responsibilities on the public lands, while the WGFD maintains management of wildlife populations.

Management emphasis in elk feedgrounds, is focused on maintenance of habitat quality and continued use of the areas as elk feedgrounds. To maintain the integrity of the elk feedgrounds, certain activities are constrained on public lands near them. The NSO restriction (Appendix P) are imposed on the lands described in Appendix R, for all activities except those which have impacts that are temporary in nature or that are compatible with elk habitat management.

In the Deadline Ridge-Graphite area, management emphasis is placed on maintaining crucial elk winter habitat.

Threatened and endangered (T&E) species and their habitats will be protected in conformance with the requirements of the ESA and associated regulations. Actions which would degrade habitat to a point of jeopardizing the continued existence of a T&E species are not allowed and are illegal.

The U.S. Fish and Wildlife Service (USFWS) is consulted on any action with reasonable potential to affect endangered species or their habitats. A biological assessment has been and will be prepared on all proposals where T&E species habitat may be affected by a proposed activity and a biological opinion will be requested from the USFWS before a decision is made.

All land use decision actions will include consideration for T&E plant and animal species. The BLM administered lands within the Pinedale Field Office will continue to be inventoried to identify potential habitat and occurrence of T&E species. Identification of habitat occupied by T&E species and habitat necessary to support these species would be managed in accordance with the National Recovery Plans for each species. Potential habitat includes: high density prairie dog towns for black-footed ferrets, wetlands for whooping cranes, high cliffs over riparian zones for peregrine falcons, and cottonwood stands along the Green, New Fork, and East Fork rivers for bald eagles. Management prescriptions for potential habitat will include consideration for future occupancy by T&E species. Key habitat characteristics are identified to help ensure maintenance of high quality areas for natural reoccupation.

Proposals for introductions of plant and(or) animal T&E species on BLM-administered lands will be evaluated and analyzed, considering the impact of other activities.

Habitat occupied by Federally listed T&E plant and animal species will be monitored to ensure continued compliance with the Endangered Species Act. The Colorado River cutthroat trout (a Category 2 species) will continue to be monitored in cooperation with the Wyoming Game and Fish Department.

Areas with habitat having potential to support transplanted or introduced wildlife species (other than T&E species) will be identified in the development of activity plans and managed in accordance with the RMP objectives. Proposals for introductions or species transplants to BLM-administered public lands will be evaluated and analyzed, and the impact to and of other resources will be considered. Cooperative agreements will be developed, if necessary, to facilitate species transplants and habitat management.

Mule deer, elk, antelope, and sage grouse use patterns are continually monitored. Habitat trends for the species are interpreted through survey data collected, in cooperation with livestock and watershed studies and monitoring activities.

The East Front Aquatic Habitat Management Plan (HMP) will be implemented to promote riparian habitat management and protect the Colorado River cutthroat trout. In addition, the East Front Aquatic HMP and the Upper Green River HMP include consideration of habitat improvement and related projects for enhancing habitat for waterfowl and aquatic species.

Riparian area maintenance, improvement, and restoration helps promote quality fish habitat on streams and lakes. Coordination with WGFD will continue on the *Comprehensive Management and Enhancement Plan* for the Colorado River cutthroat trout to improve habitat and expand the range of these trout to prevent threat of extinction. Efforts to control siltation into the East Fork and New Fork rivers will continue to improve the water quality of these fisheries. Water quality standards for other fishing streams and lakes will continue to be coordinated with WGFD and the State Department of Environmental Quality. Adherence to these standards will help maintain existing fish habitat.

High priority is given to improvement of wildlife habitat through vegetation manipulation. Table 2.18 - 2 presents identified opportunities by vegetation type and animal species seasonal habitat. Any areas identified in the future as suitable for treatment to benefit wildlife will be considered.

Vegetation treatments for livestock grazing and other resource objectives will include consideration of wildlife objectives and related restrictions. Table 2.18 - 3 describes restrictions for vegetation manipulation necessary to provide protection for wildlife in sagebrush types.

Habitat will also be enhanced by other improvements, such as development of water facilities. During development and implementation of activity plans (e.g., allotment, timber, watershed, or wildlife habitat management plans), consideration of habitat improvement needs and locations will be included. Waterfowl habitat will be considered for enhancement through improvements, specifically the Upper Green River HMP and East Front Aquatic HMP update, will provide waterfowl and fisheries habitat improvement projects. Road closures may be imposed to protect fisheries and elk habitat. The Wyoming Game and Fish Department is conducting a study of big game response to oil and gas development on the Riley Ridge natural gas project area. Findings and recommendations from this study will be used in considering future development of minerals on big game ranges.

Predator control programs will be coordinated with the U.S. Department of Agriculture and conducted in accordance with the Rock Springs District Animal Damage Control Plan.

Any cooperative allotment management plans prepared with other agencies, such as the U.S. Forest Service and *U.S. Natural Resource Conservation Service* Soil Conservation Service, will be consistent with this RMP.

2.19. SPECIAL MANAGEMENT AREAS

2.19.1. AREAS OF CRITICAL ENVIRONMENTAL CONCERN

2.19.1.1. Rock Creek ACEC

The objective for managing the Rock Creek ACEC is protection of the Rock Creek drainage to assure quality aquatic habitat for the sensitive Colorado River cutthroat trout and to provide crucial winter range for a portion of the Piney elk herd. The standards for healthy public rangelands, described in Appendix D, apply.

The existing boundaries of the 5,264-acre Rock Creek ACEC are established. Constraints will be applied to competing activities accordingly.

The entire ACEC area and the Deadline-Graphite elk winter range area (approximately 17,100 combined acres) was deferred from mineral leasing until a mineral and wildlife evaluation could be completed.

The entire ACEC will be managed as a right-of-way avoidance or exclusion area, where rights-of-way will not be allowed unless a supporting environmental analysis indicates that the action meets the objective for the ACEC, minimal impacts would occur, and(or) the action would benefit the Colorado River cutthroat trout or elk habitat.

A No Surface Occupancy (NSO) restriction for leasable minerals and other surface-disturbing activities will be applied in the 4,200-acre Rock Creek drainage (unless activities are for the purpose of benefiting the Colorado River cutthroat trout).

Geophysical exploration activities in the Rock Creek Watershed Drainage Area of the ACEC are restricted to portable methods only. The use of explosive charges will be prohibited if analysis determines that unacceptable adverse resource impacts would result.

If analysis indicates this level of protection is necessary, the drainage area will be closed to exploration and development of locatable minerals, and a withdrawal from mineral location and surface entry will be pursued.

Livestock grazing and related improvements will continue to be allowed, provided no adverse affects occur to the Rock Creek drainage.

No forest management activities will be allowed within the drainage.

The drainage will be managed as a Class I VRM area and will be closed to ORV use, including over-the-snow vehicles (43 CFR 8340.0-5).

Approximately 1,000 acres of the Rock Creek ACEC (that portion outside the drainage) will be evaluated to identify any locations where surface occupancy can be allowed. Geophysical exploration activities in this area will be evaluated on a case-by-case basis and will be restricted if analysis determines that unacceptable adverse impacts would occur to the water quality, fisheries, wildlife, recreation, or visual values in the area. This portion of the ACEC will be open to exploration and development of locatable minerals. A plan of operations will be required for any locatable minerals activities in the area. Also, this portion of the ACEC will be managed as a Class II VRM area, and ORV use will be limited to existing roads and trails with seasonal restrictions to protect wintering wildlife.

2.19.1.2. Beaver Creek ACEC

Approximately 3,548 acres are designated as the Beaver Creek ACEC.

The objectives for managing the Beaver Creek ACEC are to assure quality aquatic habitat for the sensitive Colorado River cutthroat trout and to protect elk calving habitat. The *Standards for healthy public rangelands, Appendix G, (amended April 28, 1998)*, apply.

The area is open for consideration of mineral leasing and related activities.

All vehicle use, including geophysical exploration vehicles, will be limited to existing roads and trails.

The ACEC is closed to the use of explosive charges if analysis determines that unacceptable adverse impacts would occur to the water quality, fisheries, wildlife, recreation, or visual values in the area.

The ACEC will be managed to maintain, improve, or restore riparian habitat conditions.

The ACEC will be managed as a Class III VRM area.

A detailed activity plan is being to establish guidelines for uses which could affect or jeopardize habitat quality for the Colorado River cutthroat trout and elk calving. Management prescriptions in the activity plan will include identifying specific transportation routes to reduce the potential for spills of toxic materials, and needs for seasonal use or other types of restrictions, in compliance with the decisions stated above.

Surface disturbance within 1,000 feet of the streams and on slopes of 25 percent or greater is prohibited.

Partial timber cutting is allowed provided that no adverse impacts will occur to the Colorado River cutthroat trout. Clearcutting or road construction within 1,000 feet of Beaver Creek is not allowed. Exceptions will be granted only if additional site-specific analysis verifies that such actions will not adversely affect crucial Colorado River cutthroat trout habitat.

Roads and rights-of-way must follow existing alignments unless design criteria will preclude adverse impacts to the trout and elk calving habitat.

Stream crossings are limited to lower elevations and gentler slopes.

Use of equipment and vehicles, including geophysical exploration activities, are allowed if consistent with the objectives of the ACEC.

2.19.2. WILDERNESS STUDY AREAS AND WILDERNESS

Proposed wilderness study areas (WSAs) will be managed for wilderness values in accordance with the Wilderness Act and Wilderness Regulations contained in 43 CFR 6300 and 8560 et reg. and the *BLM Interim Management Policy for Land Under Wilderness Review, H-8550-1(hereafter referred to as The Interim Management Policy). (Standards for healthy public rangelands, Appendix D, amended April 28, 1998)*

The two wilderness study areas (WSAs) in the planning area, the Scab Creek WSA and the Lake Mountain WSA, were evaluated in two previous wilderness environmental impact statements (USDI 1981b and USDI 1983). As a result of these analyses, the BLM recommended the Scab Creek WSA for designation as wilderness and the Lake Mountain WSA for nondesignation as wilderness. Both recommendations are pending further processing and Congressional decision.

Under the *Interim Management Policy,* BLM has a responsibility under the nonimparement standard to manage a WSA so that it continues to meet the wilderness suitability standard until designated as a wilderness (WSA) by Congress or released.

Until Congress acts, these WSAs will be managed under the "Interim Management Policy and Guidelines for Lands Under Wilderness Review" (USDI 1987b).

New wilderness policy states that VRMs that fall within WSAs will be managed as Visual Resource Management (VRM) Class I.

Congressional decisions on the Scab Creek and Lake Mountain WSAs will be incorporated into the approved Pinedale RMP.

Should Congress designate one or both of the WSAs (partially or wholly) as wilderness, the management of the designated areas will be for wilderness values, as described in the appropriate wilderness EIS.

Should Congress not designate one or both areas (partially or wholly) as wilderness, the management of the nondesignated areas will be in accordance with the approved Pinedale RMP. The undesignated areas will lose their identity as WSAs and will be managed along with the adjoining area as prescribed in the approved Pinedale RMP.

2.19.3. WILD AND SCENIC RIVERS

Any rivers or river segments designated or studied under the Wild and Scenic Rivers Act will be managed in accordance with their classification or Congressional designation as a wild, scenic, or recreational river. The standards for healthy public rangelands, described in Appendix D, apply.

The 19-mile segment of the Green River from Warren Bridge to the Forest Service boundary will be further studied for its potential designation as a wild, scenic, or recreational river. This segment will be studied in conjunction with a 30-mile segment on Forest Service land that is also proposed for study. Table 2.19 - 1 reflects the analysis and conclusions of this proposal for further study. Until the study is complete and Congress issues a decision, this segment of the Green River will be managed in accordance with the interim management guidance for wild and scenic rivers, in accordance with Public Law 90-542.

Should Congress decide not to designate the Upper Green River segment as a wild, scenic, or recreational river, this segment will continue to be managed as a

Special Recreation Management Area as described in the Recreation Management Decisions.

Fontenelle Creek will not be recommended for further evaluation for potential wild, scenic, or recreation river study. No further study or action will be taken. This is, this area will lose its status as a potential wild and scenic river and will be managed along with adjoining or encompassing areas as prescribed in the approved Pinedale RMP.

2.19.3.1. Withdrawals and Classifications

Whenever necessary, withdrawals in support of other resource management objectives and actions will be pursued.

Withdrawn public lands within active livestock driveways that are continuing to serve their designated purpose, will continue to be segregated from all forms of disposal under the public land laws. The withdrawals for stock driveways that are not serving their designated purpose will be terminated. Mineral locations on stock driveways will be handled under 43 CFR 3815. Disposal proposals that will not be compatible with the continued use or purpose of stock driveways will not be approved.

Existing land withdrawals, held by agencies other than BLM including the U.S. Bureau of Reclamation, currently encumbering public lands will be reviewed to determine the need for continuation, modification, revocation, or termination of the withdrawals.

Classification and *Multiple Use Act* retention and disposal classifications (Orders W-19140, W-25810, and W-12668) in Sublette and Lincoln counties will be terminated. In areas covered by these orders, discretionary management under the provisions of the *Federal Land Management Policy Act* (FLPMA) will be consistent with the provisions of the RMP.

2.19.3.2. Rights-of-Way

Applications for rights-of-way and other land use authorizations will be considered on a case-by-case basis. They will be processed consistent with the objectives of this RMP and will include any necessary mitigation requirements (Appendix P), offset retrogression, or displacement of natural resource and economic values.

To the extent possible, linear rights-of-way (e.g., pipelines, power lines, roads) will be routed where impacts will be least disturbing, taking into account point of origin, point of destination, and purpose and need of the project.

Areas closed to mineral leasing, having a no surface occupancy (NSO) restriction, or other otherwise identified as unsuitable for surface disturbance or occupancy in other sections of this RMP will be managed as avoidance or exclusion areas for rights-of-way. Such areas include, but are not limited to, recreation and cultural sites, the Rock Creek ACEC, and the Deadline Ridge-Graphite evaluation area. However, following a supporting environmental analysis, some types of rights-of-way projects may be allowed in such areas if they: would not create substantial surface disturbance; would be located in areas with a high potential for reclamation; would have impacts which would be temporary in nature; and would be compatible with the resource values being protected.

Areas requiring mitigations and restrictions for surface-disturbing activities will be managed as restricted areas for rights-of-way. Restrictions include, but are not limited to, seasonal restrictions for wildlife, sensitive watersheds, steep slopes, ORV designations, and other measures necessary to prevent degradation of cultural, historical, and recreational sites. Restricted areas for rights-of-way include wildlife crucial winter ranges, the Beaver Creek ACEC, the Upper Green River Special Recreation Management Area (SRMA), and the Soap Holes area.

Areas that are not identified as avoidance, exclusion, or restriction areas are considered open to rights-of-way.

Two transportation/transmission corridors are designated and two others are being considered for designation. Actual corridor widths will be flexible within the constraints provided in the various resource objectives of the RMP.

Due to the existing and on-going development of the Jonah Field, Pinedale Anticline Field, and Myrna Field, new corridors for the transportation of oil and gas will be identified and designated, after the completion of the NEPA review process. The criteria established by the *Guidelines for Surface Disturbing Activities* will be strictly followed.

Rights-of-way acquisition for pipeline corridor development will be coordinated with the Rock Springs FO.

The concept of a western transportation corridor, as a management action, is identified by the Pinedale FO, as tool to prevent rights-of-way encroachment across the Green River. Where possible, pipeline and utility corridors will follow existing road surface and utility rights-of-way.

Corridors are preferred routes for transportation and transmission facilities. Identification of corridors does not preclude location of transportation and transmission facilities in other areas, if environmental analysis indicates that the facilities are compatible with other resource values and objectives. Further identification of corridors does not mandate that transportation and transmission facilities will be located there if they are not compatible with other resource uses, values, and objectives in and near the corridors or if the corridors are saturated. Each right-of-way application will be reviewed and analyzed using the environmental data which exist for the area as a basis to determine compatibility with existing uses and resource values.

Communication site criteria will be developed for Mount Airey and Hogsback Mountain, and other unidentified sites to restrict use of guided towers. These criteria will propose future use of only *self standing towers*, and the eventual elimination of guided towers. Specific standards will be developed that will determine the type of towers to be erected on the aforementioned and future sites.

2.20. REFERENCES FOR CHAPTER 2

INTRODUCTION

- Decision Record and Approved Coordinated Activity Plan for the Big Piney/La Barge Area, U. S. Department of the Interior, Bureau of Land Management (Date: August 1991)
- Management Situation Analysis for the Snake River Resource Management Plan Environmental Impact Statement, Department of the Interior, Bureau of Land Management, (Date: December 2000)

2.1 AIR QUALITY

- Standard Practices Applied to Surface-Disturbing Activities

2.2 CULTURAL RESOURCES

- The Standards for Healthy Public Rangelands and Guidelines for Livestock Grazing Management for Public Lands Administered by the Bureau of Land Management in the State of Wyoming, amended April 28, 1998.
- State Protocol Agreement between the Wyoming State Director and the Wyoming State Historic Preservation Officer, April 15, 1999.
- 36 CFR Part 800, Protection of Historic Properties
- Cultural Resource Considerations Informational Bulletin No. 2002-101
- Overview of Bureau of Land Management National Environmental Policy Act Process, Desk Top Reference (Date: June 1999)

2.3 FIRES

- The Standards for Healthy Public Rangelands and Guidelines for Livestock Grazing Management for Public Lands Administered by the Bureau of Land Management in the State of Wyoming, amended April 28, 1998.

2.4 FORESTRY

- The Standards for Healthy Public Rangelands and Guidelines for Livestock Grazing Management for Public Lands Administered by the Bureau of Land Management in the State of Wyoming, amended April 28, 1998.

2.6 LANDS AND REALTY

- Recreation and Public Purposes Act are found in Title 43 of the Code of Federal Regulations (43 CFR), Parts 2740 (Sales) and 2912 (Leases).
- Management Situation Analysis for the Snake River Resource Management Plan Environmental Impact Statement, Department of the Interior, Bureau of Land Management, (Date: December 2000)

2.8 MINERALS

- The Standards for Healthy Public Rangelands and Guidelines for Livestock Grazing Management for Public Lands Administered by the Bureau of Land Management in the State of Wyoming, amended April 28, 1998.

- Decision Record and Finding of No Significant Impact for the Modified Jonah Field II Natural Gas Project, Sublette County (Date: June 2000)
- Environmental Assessment and Finding of No Significant Impact for the Modified Jonah Field II Natural Gas Project , Sublette County (Date: March 2000)
- Standard Practices Applied to Surface-Disturbing Activities
- Record of Decision (ROD) for the Pinedale Anticline Oil and Gas Development Project, Sublette County Wyoming, US Department of Interior, Bureau of Land Management (Date: July 2000)
- National Environmental Policy Act (NEPA) of 1969 (42 CFR 4321)
- Mineral Leasing Act of 1920, as amended (30 U.S.C. 181 et seq.)
- Mineral Leasing Act for Acquired Lands, as amended (30 U.S.C. 351 et seq.)
- Federal Lands Policy and Management Act of 1976 (FLPMA)
- Clean Water Act, (1977)
- Clean Air Act, 42 U.S.C. s/s 7401 et seq. (1970)
- National Historic Preservation Act of 1966 (amended 1992)
- Endangered Species Act of 1973
- Federal Coal Leasing Amendments Act of 1976
- Surface Mining Control and Reclamation Act of 1977
- Federal Onshore Oil and Gas Leasing Reform Act of 1987
- Mining Law of 1872
- BLM Surface Management Regulations 43 CFR 3809

2.9 OFF-HIGHWAY VEHICLE USE

- Mining Claims Under the General Mining Laws; Surface Management; Final Rule43 CFR 8340.0-5

2.10 PALENONTOLOGY

- The Standards for Healthy Public Rangelands and Guidelines for Livestock Grazing Management for Public Lands Administered by the Bureau of Land Management in the State of Wyoming

2.11 RECREATION RESOURCES

- The Standards for Healthy Public Rangelands and Guidelines for Livestock Grazing Management for Public Lands Administered by the Bureau of Land Management in the State of Wyoming

2.12 SOILS AND WATERSHED

- The Standards for Healthy Public Rangelands and Guidelines for Livestock Grazing Management for Public Lands Administered by the Bureau of Land Management in the State of Wyoming

- Standard Practices Applied to Surface-Disturbing Activities

Clean Water Act of 1972

- Executive Orders 11988 Floodplain Management and 11990 Protection of Wetlands
- Draft Lakeview Resource Management Plan Environmental Impact Statement Department of the Interior, Bureau of Land Management (Date: October 2001)

2.13 TRANSPORTATION AND ACCESS

- The Standards for Healthy Public Rangelands and Guidelines for Livestock Grazing Management for Public Lands Administered by the Bureau of Land Management in the State of Wyoming

2.14 VEGETATION

- The Standards for Healthy Public Rangelands and Guidelines for Livestock Grazing Management for Public Lands Administered by the Bureau of Land Management in the State of Wyoming
- Federal Noxious Weed Act (Public Law 93-629)
- Executive Order 13112 of February 1999, Invasive Species and Noxious Weeds

2.15 VISUAL RESOURCES

- Instructional Memorandum No. 2000-096

2.16 WATER QUALITY AND RIPARIAN

- The Standards for Healthy Public Rangelands and Guidelines for Livestock Grazing Management for Public Lands Administered by the Bureau of Land Management in the State of Wyoming

2.18 WILDLIFE AND FISHERIES

- The Standards for Healthy Public Rangelands and Guidelines for Livestock Grazing Management for Public Lands Administered by the Bureau of Land Management in the State of Wyoming
- Endangered Species Act of 1973
- Colorado River Cutthroat Trout Inter-Agency Five Year Management Plan (1993-1997) Green River Westside Tributary Enclave

2.19 SPECIAL MANAGEMENT AREAS

- The Standards for Healthy Public Rangelands and Guidelines for Livestock Grazing Management for Public Lands Administered by the Bureau of Land Management in the State of Wyoming
- ORV use, 43 CFR 8340.0-5
- Wilderness Act and Wilderness Regulation contained in 43 CFR 6300 and 8560 et reg.
- BLM Interim Management Policy for Land Under Wilderness Review, H-850-1
- Interim Management Policy and Guidelines for Lands Under Wilderness Review 1987b, July 5, 1995
- Public Law 90-542, Bureau of Land Management, Wild, Scenic and Recreational Rivers
- 43 CFR 3815 Bureau of Land Management, Wild Horse and Burro Compliance Inspection Priorities and Procedures
- Federal Lands Policy and Management Act of 1976
- Standard Practices Applied to Surface-Disturbing Activities

Table 2.4-1. Timber Acreage Allocations.

Commercial Category	**Commercial Conifer[1]**	**Woodland[2]**	**Total**
Category 1[3]	967	677	1,644
Category 2[4]			
Riparian Buffer	112	80	192
Deadline-Pinegrove Unit	12,126	3,330	15,456
North Piney Unit	4,450	4,097	8,547
Miller Mountain Unit	3,964	3,805	7,769
Category 3[6]			
Fort Hill (elk winter range)	277	145	422
Elk Feedgrounds	783	406	1,189
Category 4[7]			
Rock Creek ACEC (drainage only)	1,322	180	1,502
TOTAL ACREAGE	**26,605**	**14,237**	**40,842**
Acres Available for Forest Management (Categories 1 & 2)	24,223	13,506	37,729
Acres Not Available for Forest Management (Categories 3 & 4)	2,382	731	3,113

[1] Commercial conifer consists of lodgepole pine, Douglas-fir, and the spruce-fir tree species. It also contains nonstocked stands capable of supporting three species or species groups.

[2] Woodland consists of aspen and limber pine.

[3] Lands available for intensive management of forest products.

[4] Lands available for restricted management of forest products.

[5] Riparian Buffer includes only those riparian acres not included in other restrictions.

[6] Land where forest acreage would be managed to enhance other resources.

[7] Lands not available for management of forest products.

Table 2.4-2. Timber Harvest and Thinning Levels per Decade.

Timber Harvest and Thinning Levels per Decade[1]	
Harvest Level (mmbf)	9.1
Harvest Acreage[2]	1,405.0
Precommercial Thinning[3]	600.0
Total Acreage Involved	**2,005.0**
Average Acres Involved/Year	200.5
Average Volume Harvested/Year (mmbf)	0.91

[1] Harvest acreage and volume and thinning would be from Categories 1 and 2 (lands available for intensive forest management and lands available for restricted forest management) described in the Affected Environment of the draft RMP/EIS.

[2] Harvest acreage figures assume an average volume/acre of 6,478 board feet (USDI 1985a) and reflect a combination of clearcut and partial cut harvesting, as well as commercial thinning.

[3] Precommercial thinnings would generally be designed to leave a tree every eight feet (approximately 680 trees per acre) and should not result in reductions in cover ratios.

Table 2.7-1. Habitat Guidelines for Brush Control.

Habitat Classification	Guideline
Sage grouse breeding complex (that area within a two-mile radius of an active strutting ground).	Maximum of 20 percent of sagebrush type treated at any time.
Percentage restriction to be applied on each individual lek or complex of leks within contiguous buffer areas.	
Crucial antelope, mule deer, and sage grouse winter and winter yearlong range.[1]	No treatment unless beneficial to antelope, mule deer, and sage grouse.
Crucial elk winter range and winter yearlong range.[1]	Maximum of 40 percent of sagebrush type treated at any time.
Antelope, elk, moose, mule deer, and sage grouse winter, winter/yearlong, and summer habitat.[1]	Maximum of 20 percent of sagebrush type treated at any time.

[1] Percentage restrictions are applied to individual fire management units as designated on Map 14. Restricted wildlife ranges are depicted in the Affected Environment of the Draft RMP/EIS on Maps 22 through 26.

Basic Assumptions:

1. If new information indicates that wildlife would benefit from sagebrush treatment at higher levels than indicated through this process, upper levels would be adjusted accordingly.
2. In cases of seasonal range overlap, the most restrictive constraint would be applied.
3. When previously treated sagebrush areas return to a sagebrush canopy cover of 25 percent or greater, they would be considered untreated and would be added to the base acreage available for future treatment proposals.
4. Specific project design and mitigation would be developed during the activity planning phase.
5. Although only game species habitat is specified, consideration for other species associated with the sagebrush communities is built into the treatment constraints.
6. The maximum acreage available for treatment encompasses the entire vegetation type acreage in the area.

Table 2.8-1. Resource Protection Mitigation Alternative Maximum Allowable Level of Well Pad Development by Management Area. Page 1 of 2

Management Area # Name	Acres	Average # Pad/Square Mile	Maximum # Pads/Square Mile	Total Producing Pads Threshold (8)
1. Lander Trail (1)	3,460	0	0	0
2. Mesa Breaks (1)	7,366	0	0 (3)	0
3. Unleased Federal	1,347	0	0	0
4. Sensitive Viewshed	8,686	4	4(4)	28
5. Crucial Deer, Antelope, Sage Grouse Habitat	67,801	2	16 (5)	212
6. Crucial Sage Grouse Habitat	39,205	3	16(16)	183
7. Ross Butte/Blue Rim Sensitive Soils, Plants, Raptors	10,953	4	16(7)	68
8. Minimal Conflict Area	26,605	4	16	168
9. Non-Federal Lands (2)	31,925	4	16	200
TOTAL	197			859 (9)

1. Development of leases beneath this MA is provided for from wells drilled from pads located outside the MA.
2. This MA is comprised of private and state lands and minerals. BLM has no authority or control over well pad numbers/placement on private or state lands. The number of wells indicated is only an estimate based upon an average of four wells/square mile.
3. There are a few areas where the width of the Breaks may exceed the technological and economic feasibility of directional drilling, in which case BLM will consider an exception under the guidelines provided in Section 3, *Request for Exception*. Under these circumstances, production facilities will be located off-site, outside the Breaks, unless analysis shows that impacts would be less on-site than would occur at alternative locations outside the Breaks.
4. Operators will be required to consider implementing CPFs and/or pad drilling to allow for additional well pads/wells to reduce unnecessary/undue MA impacts.
5. More than 4 well pads/square mile will require operators to consider implementing CPFs and/or pad drilling to allow for additional well pads to reduce unnecessary/undue MA impacts.
6. More than 8 well pads/square mile will require operators to consider implementing CPFs and/or pad drilling to allow for additional well pads to reduce unnecessary/undue MA impacts.
7. Operators will be required to consider implementing CPFs and/or pad drilling to allow for additional well pads to reduce unnecessary/undue MA impacts.
8. If the well pad threshold is reached within a MA, no additional well pads will be authorized until additional environmental analysis has been completed. A well that is a dry hole and which

Table 2.8 - 1. Resource Protection Mitigation Alternative Maximum Allowable Level of Well Pad Development by Management Area (continued).

has been plugged and re claimed (recontoured and seeded) for one full growing season, may be credited back to the MA.

9. Although the total number of producing well pads equals 859, this is not the number of producing well pads authorized by this ROD. This total represents the number of well pads in each MA that would occur if the average number of well pads per square mile, which is considered appropriate for reasonable resource protection, was developed. The ROD analyses and allows 700 producing pads for the project area as a whole.

Table 2.8-2. Individual Management Area Objectives and Restrictions/Limitations.

Management Area Objectives	Exploration and Development Restrictions/Limitations
MA 1 – Lander Trail	
Preserve the integrity of the trail and the trail viewshed.	1. In compliance with the existing Oregon/California Trail Management Plan, within the 3,460 federal acres located within 0.25 miles of the Lander Trail, no new disturbance will be allowed on the trail except where existing improved roads and pipelines currently cross the trail. 2. To minimize impacts to the trail setting, no construction activities will be allowed within 0.25 miles of the trail on Federal Lands and minerals, unless screened from the trail by topography. 3. In the trail viewshed (defined as up to 3 miles north of the trail and south of the trail to Wyoming Highway 351) beyond the current 0.25 miles protective buffer, the complexion of a visibility analysis will be required on a case-by-case basis so that well pads, access roads and pipelines can be located on Federal lands and minerals in a manner that minimizes their visibility from the trail to the greatest extent practicable. Visibility analysis will involve completing a visual resource contrast analysis (BLM Manual H-8431-1; Form 8400-4) and utilizing viewshed analyses, such as a Figure 3-11 of the DEIS, and/or visual simulation modeling to determine the best location to screen facilities. 4. If extensive development occurs within the trail viewshed (i.e., more than 4 well pads/square mile) on Federal lands and minerals, installation of CPFs or pad drilling may be required to reduce/eliminate tanks and other facilities from well locations visible from the trail.
MA 2- Mesa Breaks	
Maintain the existing quality, suitability and habitat effectiveness of the Mesa Breaks deer crucial winter range. These Breaks provide thermal cover and forage during severe winters. Retain the existing character of the landscape and sensitive viewshed. Avoid disturbance on slopes 10 percent or greater and on sensitive soils to prevent erosion and altering the sensitive viewshed.	1. To minimize the impacts within the 7.366 Federal acres of highly sensitive wildlife habitat, soils, viewshed, and seasonal recreation use area, well pads, new access roads/pipelines (particularly the area of the Breaks and Sensitive Viewshed shown as "no new roads" on Figures 5 and 6) will avoid being placed within the Breaks on Federal lands and minerals. However, if in the course of site-specific environmental analysis BLM determines that the consequential environmental impacts would be less within the Breaks than outside, permits may be issued in the Breaks. There are a few areas where the width of the Breaks may exceed the technological and economic feasibility of directional drilling, in which case BLM will consider an exception under the guidelines provided about in Section 3, *Request for Exception*. Under these circumstances, production facilities will be located off-site, outside the Breaks. 2. The Transportation Planning Committee will review all new access roads or proposed pipeline routes through the Breaks on Federal lands and minerals and submit recommendations to the BLM on the location

	considered the most environmentally acceptable. 3. Planning for wells within this MA will require additional public involvement and monitoring under the AEM planning process. Proposed project development (e.g., well pad, pipeline, CPFs, etc.) will require site-specific NEPA analysis that addresses wildlife, soils, visibility, recreation and any other affected resources. 4. Disturbance on slopes 10 percent or greater will be avoided within the Breaks and on highly erosive soils or soils with a high degree of color contrast to prevent erosion, water quality degradation and visual contrast from disturbance.
MA – 3 Unleased Federal Minerals	
These Federal minerals have been closed to mineral lease. They include Federal minerals under the industrial park west of Pinedale, several tracts near Boulder that were withdrawn at the request of the Department of Defense, Native American sensitive sites, etc. The management objective of this MA will be to continue to hold these parcels closed to development.	
MA 4 – Sensitive Viewshed	

Protect the sensitive viewshed y retaining the existing character of the landscape. Protect/maintain winter and crucial winter deer range. Protect and maintain existing raptor nesting habitat.	1. To minimize impacts within the 8,686 Federal acres of sensitive viewshed and crucial deer winter range, the threshold of producing well pads allowed will be 28 within this MA (based on an average of two/square mile). The maximum number of pads/square mile will be four. However, pad drilling or CPFs could be used to allow for additional well pads if no unnecessary or undue short- or long-term impacts to the sensitive viewshed will occur. 2. To the extent practicable, new roads will avoid the area of the Breaks and Sensitive Viewshed shown as "no new roads" on figures 5 and 6. The installation of CPFs and/or EMPLOYMENT OF PAD DRILLING WILL BE REQUIRED ON federal lands and minerals to screen tanks, other facilities and road and pipeline disturbance that could degrade the visual quality of the landscape from view points within the town of Pinedale, adjacent housing development areas and portions of U.S. Highway 191. 3. Approval of well pad locations, new roads, or buried pipelines will be conditioned upon the operator developing a visual resource protection plan, acceptable to BLM, for the mitigation of anticipated impacts. 4. Planning for wells within this MA will require additional public involvement and monitoring under the AEM planning process. Proposed project development (e.g., well pad, pipeline, CPFs, etc.) will require site-specific NEPA analysis that addresses the sensitive viewshed, wildlife, soils, visibility, recreation and any other affected resources. 5. Disturbance on slopes 10 percent or greater will be avoided on the face of the Mesa and on highly erosive soils or soils with a high degree of color contrast to prevent erosion, water quality degradation and visual contrast from disturbance.
MA 5 – Big Game Winter Range and Sage Grouse Strutting and Nesting Habitat	
Limit surface disturbance and human activity which could displace deer and antelope from winter ranges and sage grouse from strutting and nesting habitat resulting gin mortalities and reduced population levels. Implement measures to screen activities and facilities so they do not attract the attention of a casual observer in VRM Class III areas on either side of the New Fork and Green Rivers (see DEIS Figure 3-9)	1. To minimize impacts within this 67, 801 acre big game and sage grouse crucial habitat and visually sensitive area, the threshold of producing well pads allowed will be 212 within this MA (based on an average of two/square mile). From 0 up to 16 well pads/square mile will be allowed to be constructed and drilled in any given section. 2. At more than 4 well pads/square mile, BLM may require the operators to pad drill any additional wells or to install CPFs on Federal lands and minerals. The operators will be required to demonstrate why either pad drilling or the installation of CPFs are not reasonable or practicable to eliminate production facilities (tanks, dehydration units, etc.) that require daily and weekly maintenance traffic at individual well locations. The DEIS demonstrates that it is desirable to reduce the effects of human activity upon

	wintering mule deer and sage grouse breeding and nesting. BLM will also use the results of monitoring/evaluation of resource impacts in determining the need/appropriateness of requiring pad drilling or CPFs. 3. To minimize impacts on Federal land in the VRM Class III viewshed, authorization of well pad locations, new roads, CPFs, buried pipelines, compressor stations, etc. will be conditioned upon the operator developing and submitting a visual resource protection plan, demonstrating, to AO's satisfaction, that the location and/or facilities meet VRM Class III management objectives to the extent reasonable and practicable 4. Planning for project development within this MA will be processed on a case-by-case basis and will require periodic monitoring under the AEM planning process. 5. Proposed project development on Federal lands and minerals will require site-specific environmental analysis that addresses the impacts of the proposal on, among other resources, mule deer and antelope crucial winter range use, sage grouse strutting and nesting, highly erodible soils, and VRM Class II and III areas. Such environmental analysis will be used to locate well pads, access roads, pipelines, production facilities, CPFs, compressors, etc., in a manner that minimizes impacts to wildlife, protects erodible soils, and screens the disturbance and facilities, to the extent reasonable and practicable, from the view of residences and recreation activity along the Green and/or New Fork Rivers, U.S. Highway 191 and Wyoming Highway 351 and to determine any necessary seasonal use restrictions.

Table 2.8 - 2. Individual Management Area Objectives and Restrictions/Limitations (continued)

MA 6 – Sage Grouse Strutting and Nesting Habitat	
Protect this area from unnecessary surface disturbance and human activities which could displace sage grouse from crucial strutting and nesting habitat resulting in mortalities and reduced population levels. Ensure protection of the Green River and adjacent sub-basins from increased erosion and sedimentation. Avoid activities and facilities that crate barriers to the seasonal movement of antelope. Partially retain the existing character of the landscape, on each side of U.S. Highway 191 and the Wind River Front Special Recreation Management Area (SRMA), by implementing measures which reasonably incorporate into the surface disturbance and/or facility, visual design considerations that will mitigate anticipated visual impacts so they do not dominate the view of the casual observer and so they replicate the existing characteristics of the landscape.	1. To minimize impacts within the 39, 205 Federal acres of sage grouse crucial habitat, antelope migration corridor, VRM Class III area and SRMA, the threshold of producing well pads allowed will be 183 pads within this MA (based on an average of three pads/square mile). From 0 up to 16 well pads/square mile will be allowed to be constructed and drilled. 2. If development requires more than eight pads/square mile (four pads/square mile within VRM Class III and the SRMA east of U.S. Highway 191), on Federal lands and minerals, the operators will be required to either drill additional wells from existing pads (pad drilling) or install CPFs. This will reduce the effects of human activity upon sage grouse breeding and nesting by reducing the daily and weekly maintenance traffic at individual well locations and reduce visual impacts from production facilities. BLM will also use the results of monitoring and evaluation of resource impacts in determining the need/appropriateness of requiring pad drilling or CPFs. 3. To minimize impacts on Federal lands and minerals in the VRM Class III viewshed and the Wind River Front SRMA, approval of well pad locations, new roads, pad drilling sites, CPFs, buried pipelines, etc. will be conditioned upon the operator developing and submitting a visual resource protection plan, demonstrating, to AO's satisfaction, that the location and/or facilities meet VRM Class III and SRMA management objectives to the extent reasonable and practicable. 4. Proposed project development will require site-specific environmental analysis addressing, among other resources, antelope crucial winter range use, sage grouse strutting and nesting, VRM Class III visual impacts, and SRMA objectives to best locate a well pad, access road, pipeline, production facilities, CPF, compressor, etc., in a manner that minimizes impacts to wildlife and screens the disturbance and facilities, to the extent reasonable and practicable, from the view of the U.S. Highway 191 and Wyoming Highway 351.

Table 2.8 - 2. Individual Management Area Objectives and Restrictions/Limitations (continued)

MA 7 – Ross Butte/Blue Rim	
Avoid disturbance to the fossil-bearing formations on a site-specific basis and protect paleontological fossil resources. Avoid disturbance on highly erodible soils and maintain soil stability and productivity. Protect and maintain existing raptor nesting habitat and protect sensitive plant species. Protect the visual quality of the unique badland area.	1. To minimize impacts within the 10, 953 Federal acres of fossil-bearing formations, highly erodible soils, raptor nesting habitat, and sensitive plant species, the threshold of producing well pads allowed will be 68 pads within this MA (based on an average of four pads/square mile). From 0 up to 16 will pads/square mile will be allowed to be constructed and drilled in any given section. 2. In areas of raptor nesting, on Federal lands and minerals, Operators will be required to employ directional drilling, pad drilling or the installation of CPFs to reduce and minimize impacts to nesting raptors and eliminate daily and weekly maintenance traffic at individual well locations. This will reduce the effects of human activity upon raptor nesting documented in the DEIS. BLM will also use the results of monitoring/evaluation of resource impacts in determining the need/appropriateness of requiring pad drilling or CPFs. 3. Proposed project development will require site-specific environmental analysis addressing, among other resources, paleontological values (an on-site paleontological assessment may be required), raptor nesting and breeding, erodible soils, visual quality of the badlands, and any other affected resource impacts to best locate well pads, access roads, pipelines, production facilities, CPF's, compressors, etc., in a manner that minimizes impacts to the raptors, highly erodible soils, and provides for the collection and interpretation of paleontological resources.

MA 8 – Minimal Conflict Area	
Maintain antelope summer range and avoid activities and facilities that will create barriers to the seasonal movements of antelope. Avoid highly erodible soils. Partially retain the existing character of the landscape, on each side of U.S. Highway 191 (classified as VRM Class III) and the Wind River Front SRMA, by implementing measure which reasonably incorporate into the surface disturbance and/or facility, visual design consideration that will mitigate anticipated visual impacts so they do not dominate the view of the casual observer and so they replicate the existing characteristics of the landscape.	1. To minimize impacts within the 26.605 Federal acres of antelope summer range and migration corridor, VRM Class III area, SRMA and other uses, the threshold of producing well pads allowed will be 168 pads within this MA (based on an average of four pads/square mile). From 0 to 16 well pads/square mile will be allowed to be constructed and drilled in any given section. 2. If it becomes necessary to develop more than four pads/square mile on Federal lands and minerals within the VRM Class III and SRMA east of U.S. Highway 191, the operators will be required to either drill additional wells from existing pads (pad drilling) or install CPFs. This will reduce the visual impacts from roads, pads, and production facilities. BLM will also use the results of monitoring and evaluation of resource impacts in determining the need/appropriateness of requiring pad drilling or CPFs. 3. To minimize impacts on Federal lands and minerals in the VRM Class III viewshed and the Wind River Front SRMA, approval of well pad locations, new roads, pad drilling sites, CPFs, buried pipelines, etc. will be conditioned upon the operator developing and submitting a visual resource protection plan, demonstrating, to AO's satisfaction, that the location and/or facilities meet VRM Class III and SRMA management objectives to the extent reasonable and practicable. 4. Proposed project development will require site-specific environmental analysis addressing, among other resources, antelope crucial winter range use, sage grouse strutting and nesting, VRM Class III visual impacts, and SRMA objectives to best locate a well pad, access road, pipeline, production facilities, CPF, compressor, etc., in a manner that minimizes impacts to wildlife and screens the disturbance and facilities, to the extent reasonable and practicable, from the view of the U.S. Highway 191 and Wyoming Highway 351.

MA 9 – Non-Federal Lands	
Private and state lands not under the jurisdiction of the BLM. BLM cannot impose management objectives or restriction/limitations on these lands. However, it was suggested during the public workshops that the operators voluntarily adopt the interrelated and interdependent objectives for these areas. Recommendations included maintenance, improvement and restoration of riparian habitat to provide enhanced wildlife and livestock forage/habitat; avoidance of disturbance to scrub-shrub or forested wetland types to protect water quality; survey for cultural and Native American sacred sites; cooperation with private landowners to avoid impacts to area residences; protection raptor nesting habitat, and continuing the maintenance of livestock grazing and trailing operations.	1. This MA of 31, 925 acres includes private and state lands not under the jurisdiction of the BLM. It is assumed that the number of well pads on private and state lands would average four/square mile or 200 pads. From 0 to 16 well pads/square mile cold be constructed and frilled in any given section. Lands along the rivers include most of the wetland/riparian areas found in the PAPA, farm and ranch lands, and 100-year flood plains for the New Fork and Green Rivers. The COE regulates the discharge of dredged of fill materials into waters of the United States, and would require operators to demonstrate that impacts to special aquatic sites, including wetlands, have been avoided and minimized to the maximum extent practicable. The U.S. Fish and Wildlife Service administers migratory bird species, threatened and endangered species, and species that are proposed for listing. Operators are required to comply with the Endangered Species Act, regardless of lands ownership, in the implementation of construction, drilling, and operation of natural gas development.

Table 2.8-3. Restrictions for All Surface-Disturbing Activities.

Page 1 of 2

Affected Area	Restriction	Restricted Area	Approximate Acres Restricted [1]
Big Game Crucial Winter Ranges	Nov. 15 - April 30	Antelope, elk, moose, and mule deer crucial winter ranges	461,090
Elk Calving Areas	May 1 - June 30	Designated calving area	56,080
Sage Grouse Leks and Nesting	Areas	Feb. 1 - July 31	Up to 2-mile radius of lek
Golden Eagle Nest	Feb. 1 - July 31	Within one-half mile radius	
Osprey Nest	Feb. 1 - July 31	Within one-half mile radius	
Swainson's Hawk Nest	Feb. 1 - July 31	Within one-half mile radius	
Ferruginous Hawk Nest	Feb. 1 - July 31	Within one mile radius	
Coopers Hawk Nest	Feb. 1 - July 31	Within one-half mile radius	
Burrowing Owl Nest	Feb. 1 - July 31	Within one-half mile radius	
Merlin Nest	Feb. 1 - July 31	Within one-half mile radius	
Other Raptors	Feb. 1 - July 31	Within one-half mile radius	
Elk Feedgrounds	No surface occupancy	Feeding sites and buffer areas	15,600
Riparian Habitat	No surface disturbance	Within 500 feet	7,138[2]
Upper Green River Special	Recreation Management Area	No surface disturbance	
Historic Trails	No surface disturbance	Within 1/4 mile or visual horizon (whichever is closer)	11,200

Table 2.8-3. Restrictions for All Surface-Disturbing Activities (continued).

Affected Area	**Restriction**	**Restricted Area**	**Approximate Acres Restricted** [1]
Floodplains	No surface disturbance, landfills, or disposal facilities; compliance with Executive Orders 11988 and 11990		26,220
Soap Holes Basin	Minimize surface disturbance	Soils, Watershed	20,000[3]
Cultural Sites	No surface occupancy		1,100
Recreation Sites	No surface occupancy No surface disturbance	On the site Within 1/4 mile	585
Rock Creek ACEC	No surface occupancy	ACEC	4,200
Beaver Creek ACEC	No surface disturbance	Within 1,000 feet of the creek or on slopes of 25 percent or greater	3,548
Scab Creek Area	No activity		7,636
TOTAL			**591,858**

[1] Acreages do not total due to overlapping resource concerns.

[2] Actual riparian acreage, not including 500-foot buffer.

[3] Error in previous representation of Soap Holes acreage (1,992). The corrected acreage (20,000) agrees with the map in the FEIS.

Table 2.9-1. Off-Road Vehicle Designations.

Off-Road Vehicle Designations				
Name of Area	**Type of Designation**	**Season/Dates of Restriction**	**Acres**	**Resource Being Protected**
Scab Creek Area	Closed	Year round	7,636	Wilderness
Rock Creek ACEC	Closed	Year round	4,200	Wildlife, Watershed
Holden Hill	Closed	Year round	120	Cultural
Bench Corral Feedground	Limited to authorized personnel only	11/15 - 4/30	42,230	Wildlife
Fall Creek Feedground	Limited to authorized personnel only	11/15 - 4/30	714	Wildlife
Finnegan Feedground	Limited to authorized personnel only	11/15 - 4/30	2,698	Wildlife
Franz Feedground	Limited to authorized personnel only	11/15 - 4/30	1,160	Wildlife
North Piney Feedground	Limited to authorized personnel only	11/15 - 4/30	2,519	Wildlife
Scab Creek Feedground	Limited to authorized personnel only	11/15 - 4/30	1,870	Wildlife
Miller Mountain	Limited	11/15 - 4/30	118,543	Wildlife
Deer and Antelope Winter Range	Limited	11/15 - 4/30 as needed	158,600	Wildlife
Mount Airy Proposed Open Area	Open	Year round	8,178	Recreation
Big Piney Proposed Open Area	Open	Year round	1,600	Recreation
Desert General Use Area	Open to general ORV uses	Year round	224,850	All
Remainder of Resource Area	Limited to existing roads and trails	Year round	357,662	All

Table 2.9-1. Off-Road Vehicle Designations (continued).

Total Acres			**931,000**	
Soda Lake Road	Limited	4/15 - 5/9 as needed	2.0 miles	Wildlife, Watershed
Irish Canyon Road	Limited	4/1 - 6/30 as needed	6.5 miles	Watershed, Recreation
Irish Canyon Road	Limited	4/1 - 6/30 as needed	6.5 miles	Watershed, Recreation
TOTAL MILES			**8.5 miles**	

Table 2.13-1. Access Needs.

Road/Area Identification	Land Ownership	Minerals	Range	Benefiting Resource Wildlife	Benefiting Resource Forestry	Recreation	Lands
1	Private					X	
2	Private		X				
3	Private		X				
4	Private/State	X		X			
5	Private					X	
6	Private/State					X	
7	Private					X	
8	Private			X		X	
9	Private					X	
10	Private		X				
11	Private		X			X	
12	Private		X			X	
13	Private/State					X	
14	Private		X				
15	State		X			X	
16	State		X			X	
17	Private		X			X	
18	Private		X	X	X	X	
19	Private					X	
20	Private					X	
21	Private		X				X
22	Private					X	
23	State					X	X
24	State	X	X	X	X	X	X
25	State	X	X	X	X	X	X
26	Private		X				
27	Private		X	X		X	
28	Private		X	X		X	
29	State	X					X
30	State	X	X	X	X	X	
31	Private		X	X	X	X	
32	Private		X	X		X	
33	Private/State	X		X	X	X	
34	Private	X		X	X	X	
35	Private	X	X	X	X	X	
36	State		X		X	X	
37	Private				X	X	
38	State		X		X	X	
39	Private	X			X	X	
40	Private				X		

Table 2.13-1. Access Needs (continued).

Road/Area Identification	Land Ownership	Minerals	Range	Benefiting Resource Wildlife	Benefiting Resource Forestry	Recreation	Lands
41	Private	X					
42	Private		X	X	X	X	
43	Private		X			X	
44	Private					X	
45	Private		X			X	
46	Private		X			X	
47	Private		X	X	X	X	
48	Private	X					
49	Private	X	X	X	X	X	
50	Private		X		X	X	
51	Private	X				X	
52	Private		X	X	X	X	
53	Private		X				
54	Private		X			X	
55	Private		X			X	
56	Private		X	X	X	X	

Table 2.15-1. Visual Resource Management Classifications and Acreage.

Visual Resource Management Classifications and Acreage[1]	
Classification	**Acres**
I	12,036
II	215,826
III	594,809
IV	795,329
TOTAL	**1,618,200**

[1] All lands in the planning area were rated; however, only the BLM-administered lands will be managed for these visual classes.

Table 2.18-1. Seasonal Restrictions for all Surface Disturbance Activities.

Affected Area	Restriction	Restricted Area	Approximate Acres Restricted [1]
Big Game Crucial Winter	Ranges	Nov. 15 - April 30	Antelope, elk, moose, and mule deer crucial winter ranges
Elk Calving Areas	May 1 - June 30	Designated calving area	56,080
Sage Grouse Leks	March 1 - May 15	Up to 2-mile radius of lek	Acreage will vary annually as
Nesting Areas	April 1 - July 31	Up to 2-mile radius of lek	Acreage will vary annually as
Golden Eagle Nest	Feb. 1 - July 31	Within one-half mile radius	
Osprey Nest	Feb. 1 - July 31	Within one-half mile radius	
Swainson's Hawk Nest	Feb. 1 - July 31	Within one-half mile radius	
Ferruginous Hawk Nest	Feb. 1 - July 31	Within one mile radius	
Coopers Hawk Nest	Feb. 1 - July 31	Within one-half mile radius	
Burrowing Owl Nest	Feb. 1 - July 31	Within one-half mile radius	
Merlin Nest	Feb. 1 - July 31	Within one-half mile radius	
Other Raptors	Feb. 1 - July 31	Within one-half mile radius	
Elk Feedgrounds	No surface occupancy	Feeding sites and buffer areas	15,600
Riparian Habitat	No surface disturbance	Within 500 feet	7,138[2]
Upper Green River Special Recreation Management Area	No surface disturbance		2,780
Historic Trails	No surface disturbance	Within 1/4 mile or visual horizon (whichever is closer)	11,200
Floodplains	No surface disturbance,		26,220

Table 2.18-1. Restrictions for all Surface Disturbance Activities (continued).

Affected Area	Restriction	Restricted Area	Approximate Acres Restricted [1]
	landfills, or disposal facilities; compliance with Executive Orders 11988 and 11990		
Soap Holes Basin	Minimize surface disturbance	Soils, Watershed	20,000[3]
Cultural Sites	No surface occupancy		1,100
Recreation Sites	No surface occupancy No surface disturbance	On the site Within 1/4 mile	585
Rock Creek ACEC	No surface occupancy	ACEC	4,200
Beaver Creek ACEC	No surface disturbance	Within 1,000 feet of the creek or on slopes of 25 percent or greater	3,548
Scab Creek Area	No activity		7,636
TOTAL			**591,858**

[1] Acreages do not total due to overlapping resource concerns.

[2] Actual riparian acreage, not including 500-foot buffer.

[3] Error in previous representation of Soap Holes acreage (1,992). The corrected acreage (20,000) agrees with the map in the FEIS.

Table 2.18-2. Vegetative Manipulation Opportunities.

Vegetative Manipulation Opportunities
(By Prescribed Burn)

Vegetation Type	Species Benefited	Treatment Objectives
Sagebrush/Grass	Elk	Increase volume of grass forage on winter range
	Mule deer	Increase early green forage on spring/fall range
	Antelope	Increase plant diversity and forb component on summer range
	Sage grouse	Same as antelope
Aspen-Aspen/Fir Complex	Elk	Stimulate aspen regeneration and set back subalpine fir invasion to perpetuate aspen stands in spring/summer range
	Mule deer	Same as elk
Willow Bottoms	Moose	Increase willow regeneration in critical moose habitat

Table 2.18-3. Habitat Guidelines for Brush Control.

Habitat Classification	Guideline
Sage grouse breeding complex (that area within a two-mile radius of an active strutting ground).	Maximum of 20 percent of sagebrush type treated at any time.
Percentage restriction to be applied on each individual lek or complex of leks within contiguous buffer areas.	
Crucial antelope, mule deer, and sage grouse winter and winter yearlong range.[1]	No treatment unless beneficial to antelope, mule deer, and sage grouse.
Crucial elk winter range and winter yearlong range.[1]	Maximum of 40 percent of sagebrush type treated at any time.
Antelope, elk, moose, mule deer, and sage grouse winter, winter/yearlong, and summer habitat.[1]	Maximum of 20 percent of sagebrush type treated at any time.

[1] Percentage restrictions are applied to individual fire management units as designated on Map 14. Restricted wildlife ranges are depicted in the Affected Environment of the Draft RMP/EIS on Maps 22 through 26.

Basic Assumptions:

1. If new information indicates that wildlife would benefit from sagebrush treatment at higher levels than indicated through this process, upper levels would be adjusted accordingly.
2. In cases of seasonal range overlap, the most restrictive constraint would be applied.
3. When previously treated sagebrush areas return to a sagebrush canopy cover of 25 percent or greater, they would be considered untreated and would be added to the base acreage available for future treatment proposals.
4. Specific project design and mitigation would be developed during the activity planning phase.
5. Although only game species habitat is specified, consideration for other species associated with the sagebrush communities is built into the treatment constraints.
6. The maximum acreage available for treatment encompasses the entire vegetation type acreage in the area.

Table 2.19-1. Wild and Scenic Rivers Criteria.

River or Stream	Free-Flowing Natural	Length	Water Volume	Outstandingly Remarkable Values	Water Quality	Conclusions
Green River	No impoundments or other unnatural alterations of significant nature to disqualify.	Approximately 19 miles from Warren Bridge to USFS boundary. 11 miles private, 8 miles public.	Sufficient volume permits full enjoyment of water-related outdoor recreation activities generally associated with comparable rivers.	This river has significant historic values identified; outstanding scenic values, unique wildlife habitat values, and offers a unique recreation opportunity.	Water quality is sufficient to allow contact recreation.	This river qualifies and will be considered as a potential wild and scenic river in all alternatives. Future study and potential designation should be conducted in conjunction with the 30-mile segment to be studied on the Forest.
Fontenelle Creek	Free flowing with numerous irrigation diversions.	Approximately 21 miles from Fontenelle Reservoir to USFS boundary. 15 miles private, 5 miles public, 1 mile state.	Volume allows for a wide spectrum recreation when compared to rivers already in the system or qualifying rivers.	Stream is not outstanding when compared to rivers already in the system or qualifying as potential.	Water quality is sufficient to allow contact recreation.	Water volume and values indicate disqualification This stream extends 15 miles as into Bridger-Teton National Forest. Coordination with USFS indicates USFS portion also disqualifies.

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[1]These criteria are defined in detail in the "Guidelines for Evaluating Wild, Scenic, and Recreational River Areas Proposed for Inclusion in the National Wild and Scenic Rivers System" under Section 2, PL 90-542.

3.0. AFFECTED ENVIRONMENT

This section describes environmental characteristics, conditions, and trends that influence the resolution of planning issues or that would be affected by the management actions presented in Chapter 2.0, or by other action alternatives to be defined at a later date in the RMP process. Environmental components that would not be affected or that are not essential to the resolution of planning issues are not covered in detail.

This section is based on existing information and is focused on environmental resources within the Pinedale RMPPA, unless noted otherwise. No new environmental data collection efforts were conducted on BLM-managed lands specifically for this MSA.

3.1. AIR RESOURCES

3.1.1. CLIMATE

The climate of the Pinedale RMPPA is classified as semi-arid steppe with areas of mid-latitude highland or alpine (Trewartha & Horn 1980, Martner 1986).

Steppe climate is characterized by large seasonal variations in temperature (cold winters and warm summers) and precipitation that is slight but still sufficient for the growth of short sparse grass. The dryness of the mid-latitude steppe climate of southeast Wyoming is due to its distance from the Pacific Ocean, the main source of precipitable water for North America. This aridity is further intensified by the Sierra Nevada and Rocky Mountains that block the eastward flow of humid coastal air. Also, annual rainfall amounts can vary greatly from year to year.

Mountainous areas within the Pinedale RMPPA are classified as alpine. Alpine climate is characterized by large varieties of local climates, depending on altitude and slope exposure, but is generally a similar and cooler version of nearby lowland climate (Trewartha and Horn1980). Temperature and precipitation vary as a function of several factors, including season, time of day and elevation.

Weather stations in the Pinedale RMPPA include stations located in Pinedale and Big Piney in Big Piney in Sublette County, Wyoming. Pinedale is at an elevation of 7175 feet and is in the central part of the Pinedale RMPPA. Big Piney is at an elevation of 6820 feet and is in the southern part of the Pinedale RMPPA. Meteorological data are available for Pinedale from 1948 through 2000, and for Big Piney from 1948 through 2001.

3.1.1.1. Temperature

Diurnal (morning to night) and seasonal (summer to winter) ranges in temperature are greater in valleys than on slopes (Martner 1986). Mean annual temperatures range from 52 degrees Fahrenheit (°F) in Pinedale to 53 °F at Big Piney. Mean maximum summer temperatures are 75 °F in Pinedale, and 76 °F in Big Piney. Mean minimum winter temperatures are 0 °F in Pinedale and -3 °F in Big Piney. Figure 3.1-1a shows mean monthly temperatures at Pinedale and Big Piney (Western Regional Climate Center).

The mean maximum monthly temperatures in Pinedale and Big Piney show a very slight cooling in Pinedale (Figure 3.1-1b), and in Big Piney (Figure 3.1-1c; Western Regional Climate Center).

3.1.1.2. Precipitation

High elevations generally experience greater amounts of precipitation than lower elevations. Mean annual precipitation is 11 inches in Pinedale and 7.5 inches in the lower elevation Big Piney. Mean annual precipitation ranges from 5 inches in dry years to 19 inches in wet years in Pinedale. Mean annual precipitation Big Piney ranges from 5 inches in dry years to 12 inches in wet years (Western Regional Climate Center).

Figure 3.1-2a shows mean monthly water content of precipitation in Pinedale and Big Piney. Mean monthly precipitation varies from 0.5 to 1.7 inches throughout the year in Pinedale, while precipitation in Big Piney varies from 0.3 to 1.1 inches in Big Piney (Western Regional Climate Center).

Mean total snowfall is 5 feet in Pinedale and 2.4 feet in Big Piney, with most snow occurring from November through April. Figure 3.1-2b shows mean monthly winter snowfall to range from 6 to 12 inches in Pinedale, and from 2 to 4 inches in Big Piney (Western Regional Climate Center).

The mean monthly water content of precipitation in Pinedale and Big Piney since 1948 shows a very slight precipitation increase (< .3 inch) in most months in Pinedale (Figure 3.1-2c), and a very slight decrease in Big Piney (Figure 3.1-2d). The mean annual total water content of precipitation in Pinedale and Big Piney for the same periods (Figure 3.1-2e) shows a slight increase in precipitation in Pinedale, and a very slight decrease in Big Piney (Western Regional Climate Center).

3.1.1.3. Dispersion

Atmospheric stability is a measure of the atmosphere's capacity to disperse pollutants. Although stability data are not available for the Pinedale RMPPA, they are available for Rock Springs, Wyoming (about 100 miles south of Pinedale). Figure 3.1-3 shows that mean annual dispersion at Rock Springs is very strong to moderate less than 20 percent of the time, weak to very weak about 20 percent of the time, and fair more than 60 percent of the time (BLM 1999a).

3.1.1.4. Wind Velocity

Wind speed and direction are highly variable due to the affect of local topography in the Pinedale RMPPA.

Wind data are often presented graphically by a "wind rose", which shows the occurrence frequency of wind speeds and wind directions. Figure 3.1-4 shows a wind rose for Pinedale , Wyoming.

3.1.2. AIR QUALITY

3.1.2.1. Air Quality Regulations

The basic framework for controlling air pollutants in the United States is mandated by the 1970 Clean Air Act and its amendments, and the 1999 Regional Haze Regulations. The Clean Air Act addresses criteria air pollutants, State and national ambient air quality standards for criteria air pollutants and the Prevention of Significant Deterioration program. The Regional Haze Regulations address visibility impairment.

3.1.2.1.1. Pollutants

Air Pollutants addressed in this study include criteria pollutants, hazardous air pollutants (HAP) and sulfur and nitrogen compounds, which could cause visibility impairment or acid rain.

Criteria Pollutants

Criteria pollutants are those for which national standards of concentration have been established. Pollutant concentrations greater than these standards represent a risk to human health. Criteria pollutants include carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), ozone (O_3), particulate matter (PM_{10}, $PM_{2.5}$), and lead (Pb).

Carbon Monoxide

CO is an odorless, colorless gas formed during any combustion process, such as operation of engines, fireplaces, furnaces, etc. High concentrations of CO affect the oxygen-carrying capacity of the blood and can lead to unconsciousness and asphyxiation. Wildfires are natural sources of CO.

Nitrogen and Sulfur Compounds

NO_2 is a red-brown gas formed during operation of internal combustion engines. Such engines emit a mixture of nitrogen gases, collectively called nitrogen oxides (NO_x). NO_2 can contribute to brown cloud conditions, and can convert to ammonium nitrate particles and nitric acid, which can cause visibility impairment and acid rain. Bacterial action in soil can be a natural source of nitrogen compounds.

SO_2 forms during combustion from trace levels of sulfur in coal or diesel fuel. It can convert to ammonium sulfate ($(NH_4)_2SO_4$) and sulfuric acid (H_2SO_4), which can cause visibility impairment and acid rain. Volcanoes are natural sources of SO_2.

Sulfur and nitrogen compounds that can be deposited on terrestrial and aquatic ecosystems include nitric acid (HNO_3), nitrate (NO_3^-), ammonium (NH_4^+), and sulfate

(SO_4^{--}). Nitric acid (HNO_3), and nitrate (NO_3^-) are not emitted directly into the air, but form in the atmosphere from industrial and automotive emissions of nitrogen oxides (NO_x). Sulfate (SO_4^{--}) is formed in the atmosphere from industrial emission of sulfur dioxide (SO_2). Deposition of HNO_3, NO_3^- and SO_4^{--} can adversely affect plant growth, soil chemistry, lichens, aquatic environments, and petroglyphs. Ammonium (NH_4^+) is associated with feedlots and agricultural fertilization. Deposition of NH_4^+ can affect terrestrial and aquatic vegetation. While deposition may be beneficial as a fertilizer, it can adversely affect the timing of plant growth and dormancy.

Ozone

O_3 is a faintly blue gas that is generally not emitted directly into the atmosphere, but is formed from NO_x and volatile organic compound (VOC) emissions. As stated above, internal combustion engines are the main source of NO_x. Volatile organic compounds like terpenes are very reactive. Sources of VOC include, but are not limited to, paint, varnish and some types of vegetation. The faint acrid smell common after thunderstorms is due to ozone formation by lightning. O_3 is a strong oxidizing chemical that can burn lungs and eyes, and damage plants.

Particulate Matter

Particulate matter (e.g., soil particles, hair, pollen, etc.) is essentially small particles suspended in the air that settle to the ground slowly and may be re-suspended if disturbed. Separate allowable concentration levels for particulate matter are based on the relative size of the particle:

- PM_{10}, particles with diameters less than 10 micrometers, are small enough to be inhaled and can cause adverse health effects.
- $PM_{2.5}$, particles with diameters less than 2.5 micrometers, are so small that they can be drawn deeply into the lungs and cause serious health problems. Particles in this size range are also the main cause of visibility impairment.

Before the wide use of unleaded fuel for automobiles, lead particles were emitted from tailpipes. Lead is not considered in this EIS because no proposed projects are expected to emit lead.

Hazardous Air Pollutants

There are a wide variety of hazardous air pollutants (HAPs) including N-hexane, ethylbenzene, toluene, xylene, formaldehyde, and benzene. Although HAPs do not have Federal standards, they may have "significance thresholds" established by some states and are typically evaluated for potential chronic inhalation and cancer risks.

Hazardous air pollutant emissions are associated with industrial activities, such as oil and gas operations, refineries, paint shops, dry cleaning facilities, and wood working shops.

3.1.2.1.2. Wyoming and National Ambient Air Quality Standards

Wyoming Ambient Air Quality Standards (WAAQS) and National Ambient Air Quality Standards (NAAQS) set the absolute upper limits for criteria air pollutant concentrations at all locations to which the public has access. The WAAQS and NAAQS are legally enforceable standards. Concentrations above the WAAQS and NAAQS represent a risk to human health. State standards must be equally or more strict than Federal standards.

The EPA has developed standards for each criteria pollutant for a specific averaging time (Table 3.1-1). Short averaging times (1, 3, and 24 hours) address short-term exposure while the annual standards address long-term exposure. Longer-term standards are set to lower allowable concentrations than are short-term standards to recognize the cumulative effects of long-term exposure.

3.1.2.1.3. Prevention of Significant Deterioration

The goal of the Prevention of Significant Deterioration (PSD) program is to ensure that air quality in areas with clean air does not significantly deteriorate, while maintaining a margin for future industrial growth. Under PSD, each area in the United States is classified by the air quality in that region and the incremental increases it is allowed are defined (Table 3.1-2):

- PSD Class I Areas: Areas with pristine air quality, such as wilderness areas, national parks and Indian reservations, are accorded the strictest protection. Only very small incremental increases in concentration are allowed in order to maintain the very clean air quality in these areas.

- PSD Class II Areas: Essentially, all areas that are not designated Class I are designated Class II. Moderate incremental increases in concentration are allowed, although the concentrations are not allowed to reach the concentrations set by Wyoming and Federal standards (WAAQS and NAAQS).
- PSD Class III Areas: No areas have yet been designated Class III. Concentrations would be allowed to increase all the way up to the WAAQS and NAAQS.

PSD Class I areas within the vicinity of the Pinedale RMPPA include the Bridger Wilderness Area. Sensitive Class II areas include the Bridger-Teton National Forest. The Pinedale RMPPA vicinity is also classified as PSD Class II (Figure 3.1-5).

Comparisons of potential NO_2 and SO_2 concentrations with PSD increments are intended only to evaluate a threshold of concern and do not represent a regulatory PSD Increment Consumption analysis. Regulatory PSD Increment Consumption analyses are solely the responsibility of the State of Wyoming, which has been granted primacy under the Clean Air Act.

3.1.2.1.4. Regional Haze Regulations

Visibility impairment in the form of regional haze obscures the clarity, color, texture and form of what we see. Haze-causing pollutants (mostly fine particles) are directly emitted to the atmosphere or are formed when gases emitted to the air form particles as they are carried downwind. Emissions from human-caused and natural sources can be carried great distances contributing to regional haze.

Visual range, one of several ways to express visibility, is the furthest distance a person can distinguish a dark landscape feature from a light background like the sky. Without human-caused visibility impairment, natural visual range is estimated to average about 150 miles in the western United States and about 70 miles in the eastern United States.

The Regional Haze Regulations were developed by the EPA in response to the Clean Air Act Amendments of 1990. They are intended to maintain visibility on the least impaired days and improve visibility on the most impaired days in mandatory Federal Class I areas across the United States, so that visibility in these areas is returned to natural conditions by the year 2064. These regulations require states to submit a regional haze State

Implementation Plan (SIP) and progress reports to demonstrate reasonable progress toward the 2064 goal.

3.1.2.2. Air Quality Characterization

Elements of air quality addressed in this analysis include concentrations of air pollutants, visibility, and atmospheric deposition.

3.1.2.2.1. Pollutant Concentrations

Pollutant concentration refers to the mass of pollutant present in a volume of air, and can be reported in units of micrograms per cubic meter ($\mu g/m^3$) and parts per billion (ppb). Air quality in the Pinedale RMPPA is considered excellent, however, current and complete criteria air pollutant concentration data for the RMPPA area are not available. The State of Wyoming has used monitoring to determine that the Pinedale RMPPA region is in compliance with Wyoming and National Ambient Air Quality Standards. Concentrations of criteria air pollutants are shown in Table 3.1-3 for the Pinedale RMPPA region.

Carbon Monoxide

Carbon monoxide data were collected in Colorado in conjunction with the proposed oil shale development in the 1980's. Because CO data are generally collected only in urban areas where automobile traffic levels are high, recent data are often unavailable for rural areas.

Nitrogen Dioxide

Nitrogen dioxide data were collected at the Carbon County Underground Coal Gasification site in 1994 and 1995. Although more recent NO_2 data are not available, monitoring of other nitrogen-containing pollutants shows concentrations at Pinedale and Yellowstone National Park of nitric acid (HNO_3), nitrate (NO_3), and particulate ammonium (NH_4) are fairly low and are not increasing over time.

The Clean Air Status and Trends Network (CASTNet) has measured concentrations of nitrogen-containing pollutants (nitric acid, nitrate and ammonium), as well as sulfur-containing pollutants (sulfur dioxide and sulfate) and ozone, in the United States since the late 1980's. There are three CASTNet stations in Wyoming (Centennial, Yellowstone National Park and Pinedale). CASTNet data are available for Pinedale from 1989 through 1999, and for Yellowstone National Park from 1997 through 1999.

Figure 3.1-6 shows mean annual concentrations of nitrogen-containing pollutants in Pinedale and Yellowstone National Park. Mean annual concentrations of HNO_3 are less than 0.5 ppb at Pinedale (Figure 3.1-6a), and less than 0.3 ppb in Yellowstone National Park (Figure 3.1-6b). Nitric acid concentrations typically range from 0.02 to 0.3 ppb in remote areas, and from 3 to 50 ppb in urban areas (Seinfeld 1986). Although nitric acid concentrations in Pinedale are well below urban levels, concentrations are slightly above levels typical in remote areas.

Mean annual concentrations of NO_3^- are less than 0.2 ppb at Pinedale and Yellowstone National Park. Nitrate concentrations are typically about 0.2 ppb in remote areas and 1 ppb in urban areas (Stern, 1973). Mean annual concentrations of NH_4^+ are less than 0.3 ppb in Pinedale and Yellowstone National Park. Ammonium concentrations are typically 0.3 ppb in remote areas and 1.4 ppb in urban areas (Stern, 1973).

The Wyoming Air Resources Monitoring System (WARMS) has measured concentrations of nitrate and particulate ammonium, as well as sulfur dioxide and particulate sulfate, in Wyoming since 1999. There are five WARMS stations in Wyoming: Centennial, Buffalo, Sheridan, Newcastle, and Pinedale. Figure 3.1-7a and b shows weekly concentrations in Pinedale of NO_3^- are below 1.5 $\mu g/m^3$, and concentrations of NH_4^+ are below .5 $\mu g/m^3$.

Because the chemistry of nitrogen-containing pollutants is very complex, it would be inappropriate to infer NO_2 concentrations from concentrations of HNO_3, NO_3^-, and NH_4^+. But it would be unlikely that high NO_2 concentrations would occur with low concentrations of other nitrogen-based pollutants.

Sulfur Dioxide

Sulfur dioxide data were collected at the La Barge study area in the 1980s. More recent SO_2 data, as well as SO_4^{--} data, were collected by CASTNet in Pinedale and Yellowstone National Park, and by WARMS in Pinedale.

Figures 3.1-8a and b shows mean annual CASTNet concentrations of SO_2 and SO_4^{--} in Pinedale and Yellowstone National Park. Concentrations of SO_2 are less than 0.6 ppb in Pinedale and Yellowstone National Park. Sulfur dioxide concentrations typically range from 1 to 10 ppb in remote areas, and from 20 to 200 ppb in urban areas (Seinfeld, 1986). Sulfur dioxide concentrations in Pinedale and Yellowstone National Park are consistent with concentrations typical of remote areas.

Mean annual concentrations of SO_4^{--} are below 0.75 ppb in Pinedale and below 1.2 in Yellowstone National Park. Sulfate concentrations are typically about 0.6 ppb in remote areas, and about 2.5 ppb in urban areas (Stern, 1973). Although sulfate concentrations are well below urban levels, concentrations in Pinedale and Yellowstone National Park are above levels typical in remote areas.

Figures 3.1-9a and b shows weekly WARMS concentrations of SO_2 from mid 1999 through 2001 to be about 1 .5 $\mu g/m^3$ or less. It would be inappropriate to compare weekly WARMS concentrations directly with mean annual concentrations.

Although it would not be appropriate to compare mean annual CASTNet SO_2 concentrations with national or Wyoming standards, the CASTNet and WARMS concentrations do suggest that SO_2 concentrations in Pinedale and Yellowstone National Park are still well below the NAAQS and WAAQS.

Ozone

Ozone data are collected by the CASTNet stations at Pinedale, Centennial, and Yellowstone National Park. Figure 3.1-10 shows mean annual O_3 concentrations in Pinedale and Yellowstone National Park have remained steady from 1989 through 1999, and are typical for remote areas in the western United States (Singh, et al. 1978).

Particulate Matter

Particulate matter (PM_{10}) data were collected at the Carbon County Underground Coal Gasification site in 1994 and 1995. Fine particulate matter ($PM_{2.5}$) data were estimated at one half PM_{10} concentrations as recommended by EPA. Mean annual PM_{10} concentrations were 24 percent of the NAAQS and WAAQS, and mean annual $PM_{2.5}$ were 40 percent of the NAAQS.

3.1.2.2.2. Visibility

The Inter-Agency Monitoring of Protected Visual Environments (IMPROVE) has measured visibility in national parks and wilderness areas in the United States since the 1980's. There are six IMPROVE aerosol monitoring stations in Wyoming: Brooklyn Lake (near Centennial), Bridger Wilderness (near Pinedale), Yellowstone National Park, North Absaroka Wilderness (near Dead Indian Pass), Cloud Peak, and Thunder Basin. The best visibility monitored in the contiguous United States is at the Bridger Wilderness station in western Wyoming. Visibility can be expressed in terms of deciviews (dv), a measure for describing perceived changes in visibility. One dv is defined as a change in visibility that is just perceptible to an average person, about a 10 percent change in light extinction.

Monitored aerosol concentrations are used to reconstruct visibility conditions for each day monitored, ranked from cleanest to haziest, and divided into three categories:

- 10 percent cleanest: mean visibility for the 10 percent of days with the best visibility
- average: the annual median visibility
- 10 percent haziest: mean visibility for the 10 percent of days with the poorest visibility.

Figure 3.1-11 shows annual visibility in Bridger Wilderness from 1988 through 1998. Visibility on the 20 percent cleanest days varies from 5 to 3 dv (visual range of about 145 to 180 miles). Average visibility varies from 9 to 7 dv (about 90 to 120 miles). Visibility for the 20 percent haziest days varies from 14 to 10 dv (about 60 to 90 miles). Trend analysis of Bridger Wilderness visibility data reveals no significant trend of worsening visibility from 1989 through 1998.

3.1.2.2.3. Atmospheric Deposition

Atmospheric deposition refers to the processes by which air pollutants are removed from the atmosphere and deposited on terrestrial and aquatic ecosystems, and is reported as the mass of material deposited on an area (kilogram per hectare). Air pollutants are deposited by wet deposition (precipitation) and dry deposition (gravitational settling of particles and adherence of gaseous pollutants to soil, water and vegetation). Substances deposited include:

- acids: such as sulfuric acid (H_2SO_4) and nitric acid (HNO_3); this acid deposition is sometimes referred to as acid rain
- air toxics: such as pesticides, herbicides and volatile organic compounds (VOCs)
- nutrients: such as nitrate (NO_3^-) and ammonium (NH_4^+).

The estimation of atmospheric deposition is complicated by contribution to deposition by several components: rain, snow, cloud water, particle settling, and gaseous pollutants. Deposition varies with precipitation, which, in turn, varies with elevation and time.

Wet Deposition

The National Atmospheric Deposition Program (NADP) assesses wet deposition by measuring the chemical composition of precipitation (rain and snow). There are 8 NADP stations in Wyoming. Figure 3.1-12 shows the precipitation pH in Pinedale and Yellowstone National Park from 1980 through 2000. The natural acidity of rainwater is generally considered to be represented by a range of pH values from 5.0 to 5.6 (Seinfeld, 1986).

Mean annual pH in Pinedale was below this range from 1994 through 1998, indicating acidification of precipitation during that period. Mean annual pH ranged from 4.9 to 5.0 during that period.

Figure 3.1-13 shows mean annual wet deposition of ammonium (NH_4^+), nitrate (NO_3^-) and sulfate (SO_4^{--}) at Pinedale and Yellowstone National Park NADP stations from 1980 through 2000. Wet ammonium deposition values are low: below 0.5 kg/ha in Pinedale and below 0.7 kg/ha in Yellowstone National Park.

Wet deposition of both nitrate and sulfate at the Pinedale station is also low. Wet nitrate deposition was below 3.2 kg/ha, and wet sulfate deposition was below 4 kg/ha. Wet deposition of inorganic nitrogen was below 1.1 kg/ha (Figure 3.1-13a).

Wet deposition of nitrate is below 3 kg/ha at Yellowstone National Park. Wet deposition of sulfate is below 3 kg/ha for most of the period, although deposition in was as high as 5.5 kg/ha in 1982 and 1983(Figure 3.1-13b).

Dry Deposition

Dry deposition refers to the transfer of airborne gaseous and particulate material from the atmosphere to the Earth's surface. The Clean Air Status and Trends network (CASTNet) measures dry deposition of sulfur dioxide (SO_2), nitric acid (HNO_3), sulfate (SO_4), nitrate (NO_3), and ammonium (NH_4). Figures 3.1-14a and b shows mean annual dry deposition of sulfur- and nitrogen-containing compounds for Pinedale (from 1990 through 1999) and Yellowstone National Park (from 1997 through 1999).

Dry deposition values in Pinedale are low and steady for all pollutants, although HNO_3 deposition ranged from 1.2 to 2.2 kg/ha/year. Dry deposition for other pollutants is less than 1 kg/ha.

Dry deposition values in Yellowstone National Park were also low and steady for all pollutants.

3.1.3. SUMMARY OF EXISTING AIR QUALITY

Air quality monitoring and dispersion modeling show that air quality in the Pinedale RMPPA region is generally good (Table 3.1-4).

3.2. CULTURAL RESOURCES

Approximately 5,000 cultural resources have been identified and/or recorded within various topographical and ecological settings across the entire Pinedale RMPPA. The recorded sites range from single, isolated artifacts to large, complex sites covering hundreds of acres, cultural resources date from 12,000 BP to the 1950s. Most of these sites were documented during cultural resource inventories for compliance-related projects. The Pinedale RMPPA may contain many more cultural resources beyond those inventoried to date. BLM manages the cultural resources on public lands in accordance with the legal and policy mandates and directives outlined in the previous chapter.

3.2.1. CULTURAL HISTORY

Within the set of known or recorded resources, sites can be divided broadly into prehistoric archaeological sites and landscapes, ethnohistoric (protohistoric) sites and landscapes, historic sites and landscapes, and historic trails. Several archaeological sites containing the remains of early trappers and Native American do not neatly fit into this scheme. Each period of use has left distinct signatures on the landscape of the upper Green River Basin.

3.2.1.1. Prehistoric Period

The prehistoric chronology is divided into three major periods based on technological developments and adaptive strategies: Paleoindian, Archaic, and Late Prehistoric periods. These three periods are further divided into phases, based on such characteristics as artifact assemblages, features, or shifts in settlement or resource procurement patterns.

To date, prehistoric sites have been the most prevalent cultural resources recorded in the Pinedale RMPPA. These sites represent a wide range of human activities that have left their signature on the landscape. While many of the sites are limited to surface manifestations, including the extensive secondary lithic procurement areas, archaeologists have documented intact, stratigraphic remains of multiple camps and processing areas within alluvial and eolian soils.

Archaeologists have developed a detailed chronology and land use models based on information obtained from the thousands of previous cultural resource management and research studies conducted in the Pinedale RMPPA. These investigations have resulted in the recordation and evaluation of thousands of prehistoric archaeological sites in a variety of ecological and topographical settings across the prehistoric landscape, including that portion of the landscape managed by the Pinedale Field Office.

The portion of the prehistoric landscape within the Pinedale RMPPA can be broken down into three archaeological subregions. First, the southern sagebrush steppe is an area of complex soils and geomorphology and dense Archaic period-aged occupations. Prehistoric sites dating between 4,000 and 7,000 years B.P. are common in the southern sagebrush steppe. Second, the Mesa interior upland itself is dominated by a quartzite- and chert-armored surface containing thin "A" horizon soils. This subregion contains extensive casual lithic procurement but diminished buried site potential overall. Third, the breaks around the Mesa (including both the New Fork and Green River high terraces) are a subregion of high site potential, especially of rock alignment sites and complex geomorphology.

Site types in the Pinedale RMPPA are diverse including open and sheltered campsites, housepits, stone circle and rock alignment sites, lithic scatters, kill/butchering sites, rock shelters, floral processing locales, human interment sites, sacred or respected sites, extensive lithic procurement locales, Traditional Cultural Properties, and archaeological landscapes. In addition to these sites, a single burial excavated during data recovery excavations along Highway 189 has been reinterned on public lands managed by the Pinedale Field Office.

Open campsites are one of the most common site types present in the study area, and are defined by the remains from stone tool production, such as flaked stone tools and debris, ground stone tools, and cores, as well as the remnants of domestic activity including fire-cracked rock from fire hearths, housepits, stone circles, ceramics, or ground stone. Sites containing lithic debitage and/or heat-altered rock are numerous in the Pinedale RMPPA, accounting for a high percentage of the total sites. Similarly, lithic scatters contain the same lithic remains as open campsites, but without occupational or domestic artifacts such as fire-cracked rock, ground stone, stone circles, or housepits. Several brush structures are found in the RMPPA, however, mass kill sites are rare.

Housepit sites, only identified within the past 15 to 20 years, are a second class of prehistoric habitation sites. Housepits are large circular depressions that had a superstructure (or roof) over them. Some housepit floors appear to have been excavated, often resulting in a bench that rings the depression, while others represent a shallow, unmodified floor below the roof. Most housepits have internal and peripheral cooking and storage pits or basins.

In the vicinity of Yellow Point Ridge, weathered, surficial quartzite cobbles utilized by prehistoric occupants for stone tool manufacturing, cooking, and as hearth lining define one archaeological landscape in the resource area (Site 48SU1334). The prehistoric inhabitants casually utilized these extensive deposits covering the area. In 1992, the name Yellow Point Archaeological Landscape was applied to the casual use and reduction of secondary deposits of quartzite cobbles near Yellow Point Ridge. Similarly, the Mesa Archaeological Landscape (Site 48SU2928) represents the casual use and reduction of similar deposits of quartzite cobbles in the vicinity of the Mesa south of Pinedale (BLM 1999). Because of their limited data potential, neither landscape is eligible for listing on the National Register of Historic Places (NRHP).

Sheltered camps include caves and rockshelters with evidence of extended and multiple human occupations. Typically, rock shelters and caves were used and reused as domestic or temporary structures for long periods. The dry, protected setting contributes to the preservation of the archaeological remains within these sites, providing a long and comprehensive record potentially extending far into the past. A cultural inventory in one area of the Jonah Field resulted in the recording of a prehistoric district (Site 48SU4000) with extensive rockshelters and associated occupations (Miner 2001). This inventory also recovered ceramics, obsidian, lithic sources, stone circles, and a number of artifact types critical to further understanding the prehistory of the area. Additionally, subsurface testing suggests that archaeological sites in the district contain intact, subsurface archaeological deposits. Subsurface deposits range from isolated features to complex housepit sites with associated intramural and extramural features. Management recommendations include avoidance as the preferred action and data recovery excavations and long-term monitoring through the establishment of photographic control points for sensitive archaeological deposits (Miner 2001).

In 1997, geoarchaeological field investigations were undertaken in the Burma Road Soil Survey Area/Jonah Natural Gas Field. During this study, several archaeologically sensitive areas were identified, including a broad area of low fans and terraces in the middle reaches of Sand Wash characterized by the presence of the San Arcacio soil (Eckerle and Taddie 1997). This soil type has produced a number of radiocarbon dates older than 4,000 years B.P. Many of these sites were undetected by surface inventory and only discovered during the process of pipeline, road, or well pad construction. The management of these subsurface sites in areas with San Arcacio soil, coupled with energy extraction activities, presents major conflicts.

3.2.1.2. Ethnohistoric Period

The Ethnohistoric (or Protohistoric) period begins sometime after 300 years B.P. with the first European trade goods to reach the area, and it ends with the development of the Rocky Mountain fur trade 150 years ago. Problems have arisen in identifying the transition between the Firehole phase and the Protohistoric period. Some researchers prefer to use dates indicating the earliest possible contact as the beginning of the Protohistoric period. Others have chosen the distinction based on assemblage content, including the presence or absence of European trade items. Modern ethnic affiliations to archaeological assemblages can be assigned with only moderate certainty. The Wyoming Basin was the heart of Shoshone territory during this period, with occasional forays into the area by other groups such as the Crow and Ute (Smith 1974).

The most profound influence on native cultures during this period was the introduction of the horse in the early 1700s, primarily from the Spanish settlements in Texas and New Mexico (Haines 1938, Secoy 1953). Horse culture and its attendant mobility enabled the resident Shoshone peoples to expand their range east into the Powder River Country (Shimkin 1946, 1986). Hunting, especially bison, became more efficient with a consequent increase in average group size and change in social organization. Material culture became easier to transport with the horse, and sites of this period often contain diverse assemblages, including metal knives and projectile points, glass beads, copper implements, and other European goods. Metal projectile points have been recovered from both surface and subsurface contexts in the Green River Basin, although few sites are known in the Pinedale RMPPA.

While not as prevalent as within some areas of the Green River Basin, a number of rock art sites have been recorded within the Pinedale RMPPA, including protohistoric/early historic panels with horses and at least one panel that has Fremont affinities. Both petroglyphs and pictograph panels are in the Pinedale RMPPA. Known panels include the Calpet, Names Hill, Chevron, South Piney, Fontenelle, Birch Creek Overlook, Bird Draw, Western Camp, and Alkali Creek Petroglyphs.

Native American tribes, which include the Ute, Shoshone, Crow, Arapaho, and Cheyenne tribes/nations, have been identified with specific tribal territories located in or within proximity to the Pinedale RMPPA (see Figure 3.2-1).

3.2.1.3. Historic Period

Aside from historic trails, roughly one-third of all recorded cultural resources date to the historic period. Some of these non-trail sites are directly or indirectly associated with trails. A number of sites related to various themes or contexts are present in the Pinedale RMPPA, from the Early Fur-Trapping Industry to the recent Oil and Gas Development. Historic site types include wagon roads and trails; early townsites; early homestead/ranch complexes dating from the 1880s to 1920s; early twentieth-century automobile routes; irrigation ditches; open camps dating to the Fur-Trapping period; several rendezvous sites; line camps; corrals and windmills; and the ubiquitous tin/trash scatters associated primarily with the livestock industry. Taken together, all or portions of these recourses could comprise a Rural Historic Landscape that might be eligible for listing on the NRHP.

Both Spanish and British colonial interests claimed the area. The United States' claims arose from Captain Gray's discovery of the mouth of the Columbia in 1792. The Adams-Onis Treaty of 1819 removed Spain's claims in favor of the United States, based on

Louisiana Purchase (1803) boundaries. An 1846 compromise set the Canadian boundary at its current position. The Treaty of Guadalupe Hidalgo in 1848, following the Mexican American War, removed Mexican claims from additional territories, establishing the current Pinedale RMPPA in the Oregon Territory. As territories divided, the Pinedale RMPPA was in Washington Territory from 1859 to 1863, between the Idaho and Dakota Territories from 1864 to 1868, and in the Wyoming Territory after 1868. Wyoming became a state in 1890. Lincoln County split from the larger Uinta County in 1911, and Sublette County separated from Lincoln and Fremont Counties in 1921.

Geographically, the Pinedale RMPPA is characterized by the headwaters of the Green River system, which the local Native Americans called Seeds-Ke-Dee-Agie (or Sage Hen River). When the fur trappers and traders came to the Green River Basin, they took advantage of the drainage systems to trap abundant beaver and to trade with the Native peoples. The upper Green River country was the select northern Emigrant Trail route because it offered one of the simpler places for wagons to cross the Continental Divide, due to its comparatively gentle topography and abundant water and game. Early guides and trails led emigrants *through* the region, as early settlers were intent on moister lands on the coast.

Difficult farming attributed to aridity, altitude, and a short growing season are major reasons why open range livestock ranching was the primary industry of permanent settlement in the upper Green River country. Open range ranching on the upper Green was adjusted to seasonal cycles and central ranches stationed strategically to take advantage of major water sources and drainages. Later extraction of oil from Pinedale RMPPA lands ultimately followed geologic divisions in establishment of formal field boundaries. These mineral reserves were placed under tighter Federal control in 1915, following previous reserve of forest lands and reclamation enactments to make arable lands in the arid West.

3.2.1.3.1. Early Exploration

Early exploration is marked by the expansion of the fur trade, opening American Frontiers. It is also manifest in various expeditions both to survey access and explore the extent of resources offered by expansion of United States' territories.

Fur Trade

The Fur Trade era in the Pinedale RMPPA begins with the Astorian expedition in 1811 and ends with the opening of the Oregon Trail by missionaries in 1836. Fur Trade in greater North America began with colonization/contact in the early 1500s and declined with the end of beaver-felt hat popularity in the 1830s. The fur trade was focused across the Pinedale RMPPA by competition with an expanding British/Canadian fur trade (McKenzie's North West Company and later the Hudson Bay Company) and the location of the mouth of the Columbia River by American ship captain Robert Gray in 1792 (representing Bostonians in the sea otter fur trade of 1780s-1815 with China). The mouth of the Columbia River gave Lewis and Clark a known destination in their exploration of Louisiana Purchase lands after 1803. It provided known territory for extension of the Astor's American and Pacific Fur Companies by the William Price Hunt expedition in 1811. John Colter, in 1806, split from Lewis and Clark, and Robert Stuart returned from Fort Astoria in 1812, both providing more information on this region. Stuart pioneered South Pass access from the upper Green River.

The War of 1812 caused a lull in exploration, but 1824 brought William Sublette and Jedediah Smith back through South Pass. By 1825, the mountain men of William Ashley and Andrew Henry's Rocky Mountain Fur Company were working the upper Green River Basin. In 1832, Captain Benjamin Bonneville brought wagons over South Pass and established Fort Bonneville on the Green River (near current Daniel Junction). From 1833 to 1840, rendezvous were held intermittently on the Green River within the Pinedale RMPPA. After the decline of the beaver trade, mountain men were left mainly to guide emigrants on the Oregon Trail, operate trail trading posts and ferries, or work the buffalo hide trade on the Plains.

Expeditions

The era of expeditions in the northwest Wyoming region basically began when John Colter left the Lewis and Clark corps in 1806 and ended with the last of the larger formal survey parties, when the Hayden expedition passed through Wyoming and the Pinedale RMPPA around 1877. Early expeditions were connected to national expansion, and later expeditions tended to be working toward the expansion of settlement, industry, and transportation. All expeditions were characterized by objectives to open new access and explore exploitable resources. Many of the significant early overland expeditions were integral to the expansion of the American fur trade.

The first survey party in the Pinedale RMPPA, the Fremont expedition, was surveying the extant Oregon Trail in 1842. Beginning in 1857, Frederick Lander began further road surveys across the Pinedale RMPPA in development of what would be known commonly as the Lander Road, an alternate route on the Emigrant Trail system. In 1869, down the Green River from the Pinedale RMPPA, John Wesley Powell conducted the geological survey of the Colorado and Green River canyons that left a lasting policy legacy affecting the entire West. The Hayden Geological Survey that came through in 1877 was important for producing road and trail system maps.

3.2.1.3.2. Transportation

The history of the West is marked by mobility. The transportation system in the West is composed of networks spanning long distances to connect remote and scattered places. History of western transportation is marked by a series of progressive changes in transport systems that shortened the time it took to traverse wide areas. These changes did not fully result in the replacement of preceding systems, but augmented them; the railroad supplanted the Emigrant Trails and the automobile road supplanted first the wagon road (early Expansion-Era roads) and then, to a large extent, the railroad.

Emigrant Trails

Use of the Emigrant Trail system began with the Whitman-Spaulding mission in 1836, following routes and guides established in the Fur Trade era. The trails saw a decline of usage with the connection of the Transcontinental Railroad in 1869, although the trails did receive continued use after 1869, especially as part of the stage and freight routing. The Lander Trail in the Pinedale RMPPA was used by emigrant wagons as late as 1912.

On the Sublette Cut-off of the Trail—on the southern edge of the Pinedale RMPPA—was 'Mountain Man's Ferry' near Names Hill, established about 1849 by mountain man Jim Baker. After the Mormons settled Salt Lake in 1847, they built and ran many ferries at various river crossings along trail alternates and they set up trading posts. With the California Gold Rush of 1849, traffic over the trail system increased substantially, but traffic shifted toward more southerly alternatives during the Civil War years when local military troops were called east, exposing travelers to hostile Indian encounters.

The Lander Cut-off is prominent in the Pinedale RMPPA. Beginning in 1857, it was the first engineered road west of the Mississippi. Its purpose was to create an efficient travel route between Fort Kearny and Fort Hall, with fordable Green River crossings, and better water and forage access. The Lander Road was funded by Congress due to increased Emigrant Trail traffic associated with the Gold Rush of 1849.

Railroad

The Transcontinental Railroad, connected coast-to-coast in 1869, took on traffic that previously used the Emigrant Trail system. The railroad followed a path similar to (and often overlapping) the Emigrant Trails. The railroad did not just provide alternative transportation. Included in the railroads' promotional offers, to create their own market in the expanses of the West, was free transport for anyone wishing to settle/buy railroad lands. Railroad lands usually had been preempted to private companies by Congress to help finance railroad expansion. The Oregon Shortline Railroad branch was added to the Union Pacific Mainline in 1882, bringing railroads even closer to the Pinedale RMPPA on their way through Opal, 30 miles to the south.

In general, the railroad permitted easier access for shipment of inland western products to eastern and pacific coastal markets. The railroad served to open up the Wyoming Territory and the Pinedale RMPPA by allowing these previously thought marginal lands to become economically viable for ranching.

Expansion Era Roads

Expansion Era Roads are those that came after the connection of the Transcontinental Railroad and tended to network from railroad arteries. Named main artery wagon roads include the Opal and the New Fork Roads. The Lander Cut-off of the Emigrant Trail system was used in part as a stage and freight route during the Expansion Era. Use of these roads created networks accessing local resources instead of simply channeling traffic across the region as the Emigrant Trails originally did.

The Opal Wagon Road was approximately 30 miles long between the upper Green River and the railroad (Rosenberg 1984). Once constructed, the Oregon Short Line Railroad to Opal was less than half the distance of the older Union Pacific mainline corridor from the Pinedale RMPPA. The Opal Wagon road replaced previous preferences for travel to the mainline at Green River City, and it became the premier freight and cattle drive route for the region after 1882. The New Fork Wagon Road formed to serve the east side of the upper Green River Valley. The New Fork Wagon Road accessed the Union Pacific Mainline at Rock Springs, providing ranchers with a direct market for their products.

Automobile Roads

If the railroads increased the ease with which goods could be freighted in and commodities shipped out, the auto roads came to increase the speed with which places beyond the rails could be reached by people and transported goods. Like the transportation networks that preceded the automobile route, the auto road used arterial ways, eliminating the need for peripheral sidetracks and back roads. Auto roads began along the same major transportation corridors as the Emigrant Trails system and railroads before. The first transcontinental highway (the Lincoln Highway or US Highway 30) passed proximate to the first Transcontinental Railroad route, south of the Pinedale RMPPA, allowing tourist auto traffic to connect to Yellowstone from the south across the Pinedale RMPPA. The construction of Interstate 80 in the 1960s increased the volume of traffic diverging through the Pinedale RMPPA.

In the Pinedale RMPPA, development of highway routing roughly paralleled development of the Opal and New Fork Wagon Roads in route and sequence. In 1924, the current Highway 189 corridor was first constructed on the west side of the Green River Basin, mostly following the corridor the Opal Wagon Road. Highway 191 arose from the Rock Springs auto road, but it does not totally overlap that earlier auto road. The auto road to and from Rock Springs began in 1907 when a road was built south of New Fork across 70 miles of waterless desert, inhospitable for horse and wagon use. Before this time, improvements were being made along the road from Rock Springs to Pinedale around 1906, following some of the same points as the New Fork Wagon Road. The direct route from the Lincoln Highway at Rock Springs to Yellowstone was completed through Hoback Canyon in 1920, increasing the access through the area for tourists to Yellowstone.

3.2.1.3.3. Settlement and Industry

Settlement and industry are intertwined in the Pinedale RMPPA. The cattle ranching industry is largely responsible for the ultimate settlement of the upper Green River region, with many communities growing from ranch centers. The growth of these ranching centers were all supported by railroading, mining and logging activities. The oil industry came later, adding much to the community development that started in the initial ranching era.

Homesteading

Homesteading laws were very important for the settlement of the West and the Pinedale RMPPA. They provided a principal means of transfer of Federal lands to private individuals. Most area ranch lands were patented because of one or another of the various homestead laws.

The *Homestead Act* has its foundations in the Free-Soil Party of 1848, later subsumed in the new Republican Party in 1854. The southern states were opposed to the homestead movement because it tended to be anti-slave. Concluding the Mexican-American War in 1848, the United States had acquired western lands that had to be designated ‘slave’ or ‘non-slave.’ The Free-Soil Party advocated free land, and the Republicans used this homestead platform in electing Abraham Lincoln in 1860. The Civil War allowed the

North to pass the *Homestead Act* of 1862. By then, emigrant travel had traversed the Emigrant Trails system for twenty years. The *Homestead Act* encouraged new satellite settlements of Mormons from Salt Lake, many in southeastern Idaho and some in southwestern Wyoming. Other laws presenting opportunities to expand homestead holdings followed: the *Timber Culture Act* of 1873, the *Desert Land Act* of 1877, the *Enlarged Homestead Act* of 1909, and the *Stock Raising Act* of 1916. Laws concerning reclamation were also passed, such as the *Carey Act* of 1894 and the *Reclamation Act* of 1902. Ironically, these reclamation acts were followed by the *Dry Farming Homestead* of 1910, which encouraged development without irrigation through advancement of soil management techniques. In short, all of the laws held in common a requirement of use and improvement, usually biased toward farming.

Ranching

Ranching has been the traditional industry in the Pinedale RMPPA, with its roots in the Fur Trade era. Ranching can be divided into two eras: 1800s and 1900s. Wyoming cattle ranching may have begun with Fort Bridger on the Green River in 1843 when Jim Bridger bought and sold stock from emigrants, and it expanded when William Carter of Fort Bridger drove Texas cattle to be fattened in Wyoming and shipped east after the Civil War.

The completion of the Transcontinental Railroad in 1868 allowed permanent ranching settlement to begin in the Pinedale RMPPA. Central ranches tended to be established on good riparian bottomlands, with natural grass pastures and good permanent water sources. Outward from center, ranches needed wide rangelands to support their cattle. Patenting under the various homestead acts was a usual way of establishing ranchland, while the open range was left public. As with much of the West, area ranches tended toward consolidation into large ranches, as a way to more sustainably maintain profitable herd sizes. Cattle were the chief stock type on the range, although the area's first settler (John 'Sheep' Smith) on Fontenelle Creek did run sheep.

Cattle herds in the Pinedale RMPPA were decimated by the winter of 1889-1890. Afterward, range management techniques changed. Perhaps most significantly, hay meadows were intensively developed and more feed put away to supplement winter range. Some area ranchers were also led to run sheep as a means to help cheaply reestablish their ranches. In the scheme of things, sheep sold for about one-tenth of the cost of a cow and could browse poorer range. On the other end of the spectrum, horse raising could bring several hundred dollars per head for a quality horse, and horses did not necessarily have to be run in the same numbers as cattle to be profitable. With more sheep on the range beginning in the 1890s, cattleman-sheepman conflicts increased. In 1895, cowboys slaughtered sheep herds and forcefully deported herders at what was to be known as Raid Lake, northeast of the Pinedale RMPPA.

Dude or ‘guest’ ranching, including hunting resorts and outfitting, were also formally established on the upper Green River in 1897. The Billy Wells’ Gros Ventre Lodge was the first, north of Cora; although, technically William Sublette became the first outfitter when he was hired to sportingly take Scotch Captain William Stuart’s party to the 1834 Rendezvous.

The killing winter of 1889-1890 demarcates the change of cattle ranching practices in the upper Green River country and the closing of the open range. Soon the aggregation of ranches that gathered to sort their brands from ranging cattle was reformed into formal grazing associations. These organizations addressed concerns about drift fencing and Federal grazing permits for lands withdrawn for Federal forest reserves in 1891. The *Stockraising Homestead Act* of 1916 finally divided U.S. Forest Service grazing allotments and initialized fencing of public rangelands. Grazing associations gave ranches the foundation they needed to maintain their operations in the face of change in Federal land use policies, not only from the 1905 institution of the U.S. Forest Service and the 1916 grazing laws, but also from the later *Taylor Grazing Act* of 1934, which eventually resulted in the formation of the Bureau of Land Management in 1946.

The *Taylor Grazing Act* was legislated in the Great Depression. The TGA permitted the Secretary of the Interior to place public lands chiefly valuable for grazing and forage crops into grazing districts. After the TGA was signed President FDR withdrew all vacant, unreserved, and unappropriated public land in the West from nonmineral entry.

This allowed the grazing district to be set aside for that purpose. It withdrew remaining General Land Office lands into grazing allotments managed by the Federal Grazing Service, which later combined to form lands managed by the BLM. The same year of *Taylor Grazing Act* enactment, the Pinedale RMPPA experienced a range disaster similar to the winter of 1889-1890. Prolonged drought and a falling Depression-era cattle market caused an emergency culling and forced slaughter programs to be implemented on regional herds.

The *Taylor Grazing Act* resulted in grazing practice changes. The range was closing further, and cattle moved along narrow driveways between summer and winter range. The system of animal units per month was set in 1937, restricting cattle density in grazing allotments based on estimated natural forage production. The law also increased seasonal restrictions on range use, in part causing a greater need for water development and catchments on desert lands. The Civilian Conservation Corps assisted on many of these range improvements during the Depression (1934 through 1942). In 1935, the National Soil Conservation Service was also created, assisting ranchers with range improvements and erosion control. After 1946, the BLM began building stock tanks, water wells and pipelines, and stock ponds on its lands to serve the cattle industry and wildlife.

The BLM began a policy of granting grazing allotment permits to individual ranchers rather than associations. These individual allotments were being separately fenced through the 1950s. When the highway corridors were fenced off from the range in the 1950s, the open range was finally closed. The 1960s had increased, active technical range management policies being instituted, particularly under the auspices of the BLM, and the 1970s saw the end of cow camps and the range wagon system, where wagon camps were no longer useful.

Timber Industry

Logging occurred primarily adjacent to the Pinedale RMPPA on U. S. Forest Service land, and the 40,000 acres of forested land located in the Pinedale. The main mode of logging was the cutting of ties, or ‘tie hacking,’ to supply the railroads and mine spars. Tie hack camps utilized the timber, and small, locally-operated sawmills and portable sawmills were established to supply lumber. Area rivers were used and worked to transport ties to Green River City, Wyoming. The tie-hack industry arose at the end of the 1860s with construction of the Transcontinental Railroad and ended with large-scale sawmill tie production in the 1940s.

Mining

No significant precious metal extraction occurred in the Pinedale RMPPA, although prospectors traversed the vicinity. However, two small coal mines are known for local fuel production. Mining strikes in surrounding regions and territories did have an effect on the Pinedale RMPPA. The Transcontinental Railroad passed to the south of the Pinedale RMPPA on a route similar to that of the Emigrant Trail, since sources of coal were available, as at Kemmerer, to mine for locomotive fuel. As the railroad was being built, the gold strike at South Pass occurred, causing an influx of people into the region as well.

Oil and Gas Industry

Oil was located in the Pinedale RMPPA as early as 1892. The gas industry, which drives more recent mineral exploration and production, began initially as a byproduct of oil exploration and production. The gas boom arrived chiefly after World War II, amplified with the Energy Crisis of the 1970s, and flourishes today.

Charles Lackey, Charles Budd, and W.D. Newlon were responsible for pioneering field development out of LaBarge and Big Piney. By the time oil exploration was established in the LaBarge and Big Piney fields, the United States and Wyoming oil booms were well under way. The boom was driven mostly by gasoline demands, heightened by World War I and declining East Coast mineral reserves. The Standard Oil Trust had already been broken up in 1911.

The Pinedale RMPPA oil industry was forming in 1919 on the cusp of the 1920 legal change from oil land patents based on placer mining claims to Federal leasing of recently (1915) withdrawn public mineral reserves. The Department of Interior was given administration of United States oil reserves following the Tea Pot Dome Federal graft scandal. The 1920s legislation also sought more responsible development of market supply and supply conservation to halt the rapid short-term exploitation practices encouraged by the 1840s Rule of Capture. President Coolidge formed the Federal Oil Conservation Board in 1924 to advise on regulating the industry. It was followed in 1929 by the non-government Interstate Oil Compact Commission that would be ratified by states in 1935, followed by the *National Industrial Recovery Act*. Lack of implemented regulation came to a head in the 1930s, causing the Hoover administration to mandate that the oil fields be united for cooperative management of oil and gas deposits, mostly by geologic division/extent. After the Great Depression, World War II caused a great upsurge in demand for oil. The oil and gas industry is typically one of ‘boom and bust’, depending on level and economy of supply and demand.

Formation of Towns and Communities

Settlement spread from transportation corridors and drainage networks important for the establishment of ranches. As later stage and freight routes formed to service ranches and ranch communities, settlers often followed ranch wagon roads or bent to pass directly by ranch headquarters. Early ranches often supplied their own schools and started post offices to service their vicinity. From these ranch centers, towns such as Viola developed. Other towns formed at strategic points on trade routes where businesses like the Vible Store opened to service a local area along a main road. Both ranch communities (and later oil development communities) were also the subject of speculators who sought to subdivide lots and attract residential and commercial town growth. Many rural communities consolidated or shifted with change in markets and the shortening of distances by improved roads and the arrival of automobile transportation.

Some small communities arise during booms and do not survive busts. Ranching has persevered, supporting the development of and being the sustenance for many local communities. Like the ranches themselves, many of the small ‘in between’ communities have faded, consolidating with or becoming the rural base of those surrounding communities that have persisted.

3.2.2. CULTURAL RESOURCE CONCERNS

Existing cultural resource concerns within the Pinedale RMPPA involve prehistoric archaeological sites, Traditional Cultural Properties, rock art, and trails.

3.2.2.1. Prehistoric Archaeological Sites

Prehistoric sites can potentially have scientific, conservation, and traditional values. The time period, location, integrity, and structure of a particular site influence the degree of its scientific value. For the same reasons that these sites have high scientific values, they can also have high conservation values. Preservation of a sub-set of these sites, depending on their characteristics, may be important to maintain their data in anticipation of future improvements in data recovery techniques. Prehistoric sites also have traditional use significance. In general, those sites that have traditional significance cannot be identified from a set of physical characteristics, but rather, must be identified by a tribal representative who visits the site. Traditional significance is placed on or is derived from ideological beliefs about the residing of human spirits in given locations. The BLM consults with all Native American tribes that have aboriginal territories within the Pinedale RMPPA as part of the Section 106 process and determine the presence of archaeological sites.

Because these sites are less visible than other sites (such as some historic sites), they are not as prone to deliberate vandalism. However, they are more prone to incidental or accidental damage through actions such as off-highway vehicle use or camping. Existing procedures (inventory, evaluation, and avoidance/data recovery for significant sites) are usually adequate to avoid adverse impacts, and can be accommodated by the Wyoming Protocol, which usually includes avoidance, special construction stipulations, or data recovery excavations. Causal secondary lithic procurement landscapes continue to be treated as not significant or eligible for listing on the NRHP due to their limited data potential and lack of intact, subsurface archaeological deposits. Specific site concerns include:

- Wardell Site -- The Wardell Site, a possible Avonlea bison bed/kill site that is currently listed on the NRHP, is being severely impacted by erosion. There should be a continuing effort to fund and implement a stabilization plan for the site. The continuation of periodic monitoring of the site is needed to ensure that proper measures are employed to protect for future generations.

- Boulder Lake District -- A Cultural Resource Management Plan has been developed for this property, which is currently being impacted by shoreline action, unauthorized collection, and vandalism. This district is managed for the preservation of cultural and historical values, including periodic patrolling by law enforcement personnel to prevent the collection of artifacts and site vandalism.
- Jonah/Pinedale Anticline/LaBarge Gas and Oil Fields -- Compliance-related efforts in the Jonah/Pinedale Anticline/LaBarge oil and gas fields will continue to be performed under the National PA/Wyoming Protocol. Site 48SU4000 is a large, complex archaeological district consisting of approximately 25 archaeological locales. Most of the locales are small rock shelters with features and associated artifact scatters. Because the area is currently part of a lease that cannot be withdrawn, this site may be threatened by development sometime in the future. The BLM is currently working with industry officials to develop a program where the industry will sponsor data recovery excavations at one site for each well they develop in the area.

3.2.2.2. Traditional Cultural Properties

Non-archaeological site types are distinguished from archaeological site types because they are not necessarily associated with prehistoric or historic artifacts assemblages and collections but may include vision quest areas, vegetal and mammal processing areas, ceremonial areas, and other types of areas. These sites are often referred to as TCPs and are typically identified by tribal representatives during the government-to-government consultation process that is required of Federal agencies. However, TCPs can also be identified by representatives of other culture groups, such as historic culture groups associated with the Euro-American migration to the western United States. Only one TCP (the Aspen Ridge Area) has been identified and recorded within the Pinedale RMPPA. It is possible that more sites of this type exist in the area, but locational and traditional data has not been recorded due to issues of confidentiality.

The BLM is mandated to consult with Native American tribes concerning the identification of cultural values, religious beliefs, and traditional practices of Native American people that may be affected by actions on Federal lands. Places which may be of traditional cultural importance to Native American people include, but are not limited to, locations associated with the traditional beliefs concerning tribal origins, cultural history, or the nature of the world; locations where religious practitioners go, either in the past or the present, to perform ceremonial activities based on traditional cultural rules of practice; ancestral habitation sites; trails; burial sites; and places from which plants, animals, minerals, and waters possessing healing powers or used for other subsistence purposes may be taken.

The BLM consults with all Native American tribes with aboriginal territories within the Pinedale Field Office as part of the Section 106 process to determine the presence of non-archaeological site types, which are usually identified as TCPs and sacred areas. The BLM makes every effort to keep any information concerning these site types confidential to the extent possible. Typically, a tribe is not comfortable giving any information about these site types. The Federal government will not be able to protect these sites if there is no locational information. In these cases, a boundary marker placed on a topographic map could at least provide sufficient locational information to protect the site. These site types can be further protected if a tribe is willing to provide traditional use information that can be used to determine eligibility to the NRHP.

3.2.2.3 Burials

Fewer than 10 burial sites are known in the upper Green River Basin region – mostly of single individuals. Most recorded burials include grave goods, such as beads and pendants. Many individual burials are located within rock shelters or cave sites, while others are located in shallow pits in open camps. Burials and burial sites are recognized by Native Americans as sacred places that should not be disturbed. The most important concerns of Native Americans are the discovery and protection, as well as cultural affiliation, of burial sites. Many Native American groups, including groups that claim cultural affiliation within the Pinedale RMPPA, maintain the following beliefs:

- The spirits of deceased ancestors remain associated with the burial for an undeterminable length of time and should not be disturbed. Disturbance interrupts the journey the spirit must make.
- Disturbance may also anger the spirit and cause harm to the living.
- Disturbance is disrespectful.

The Native American Graves Protection and Repatriation Act and the American Indian Religious Freedom Act are laws that focus on issues of protection and repatriation of Native American burials; associated cultural artifacts; and access to and use of these sites by tribes that claim cultural affiliation. Human burials require significant protection because of particular legal issues related to burials.

Avoidance of archaeological sites containing graves is encouraged, as are intensive surveys to identify such sites. Archaeological investigations for planning or research purposes on Federal and tribal lands, and other land-modifying activities on Federal lands that inadvertently discover such items, are required to consult with affiliated Native Americans.

3.2.2.4. Rock Art Sites

Known rock art sites are open for consideration of activities such as fencing, interpretive signs, or barriers to ensure protection to the sites. These areas are, in most cases, closed to surface-disturbing activities that could adversely affect rock art resources (e.g., activities associated with mineral exploration and development; construction of roads, pipelines, power lines, etc.); to the location of mining claims (withdrawals would be pursued as necessary); to mineral material sales of sand, gravel, or other types of construction or building materials; and to the use of explosives and blasting. These areas are closed to off-highway vehicle travel, including vehicles used for geophysical exploration activities, and are also closed to the use of fire retardant chemicals containing dyes. Representatives from the Shoshone and Ute tribes have stated during on-site meetings with BLM personnel that all rock art sites in the Green River Basin are significant to contemporary groups. All other rock art sites are managed on a case-by-case basis according to resource values.

3.2.2.5. Historic Trails

Protection of the Oregon and Mormon Pioneer National Historic Trails and the Pony Express and California historic trails involves cooperation with the National Park Service in implementation of the Comprehensive Historic Trails Management Plan for the Oregon and Mormon Pioneer National Historic Trails. While there are many protection measures in place, development activities such as roads, pipelines, and power lines can cross trails in areas where previous disturbance has occurred and the trail has lost its

NRHP characteristics and would no longer be considered a contributing segment to the trail.

3.2.2.6. Historical Sites

This set of properties includes architectural sites, trash scatters, fur-trapper sites, irrigation structures, early oil and gas fields, and potentially historical landscapes, such as the South Pass area. As highly visible sites, they are potentially more subject to vandalism than other sites, and measures are taken to protect these sites. Additionally, the architectural elements for some of these sites (walls, floors, etc.) are also subject to weathering and deterioration. When time and money allow, efforts are taken to stabilize such sites. Efforts are made to balance the various competing interests in these sites and determine means of protecting them from human and natural harm. Fee-based interpretation programs established at well-preserved sites also have the potential to bring in much needed revenue that could be used either for continued maintenance of the site itself or the development of similar interpretive programs at other sites. Trash scatters, in general, are not considered significant or eligible for inclusion on the NRHP because their association would be difficult to establish and because they are not likely to produce information that would further our understanding of the region's history.

3.3. FIRES

Fire in the Pinedale RMPPA falls under two categories: unplanned and planned. Unplanned fires are those that occur as the result of an act of nature, such as lightning, or occur either as human accident or by intent to cause damage. Planned fire is fire used for beneficial purposes, such as clearing of vegetation, in a controlled manner under a specific prescription or planned effort. Over the past 100 years, fire has been suppressed extensively in the resource area, causing the general build-up of vegetative fuels and deadwood. Also, extremely dry conditions over the past few years have made vegetation less resistant to fire.

Lightning accounts for most of the fires within the region. Human-caused fires can be caused by fireworks, wood cutting, or camping. No pattern exists to predict future unplanned fire problems.

Vegetative communities that would be most susceptible to fire include sagebrush and grassland communities in the lower elevations, and conifer species, such as lodgepole and limber pine, in wooded areas. In wooded areas, fuel sources include dead and down timber or standing timber with high loading value because of the lack of fire in the past and dry weather conditions. Aspen is not as susceptible to fire as conifers and woodland species.

3.4. FORESTRY

Forest, woodland, and conifer resources are described in Section 3.15.1. Uses of forests range from intensive use for forest product production to emphasis on natural and recreational values. Forest production includes sawtimber, firewood, Christmas trees, posts, poles, and wildlings for individuals and commerce.

Timber harvesting practices are consistent with accepted silvicultural guidelines for each species but also reflect individual stand conditions or other resource and environmental concerns. Existing and future harvest areas are monitored to ensure reforestation and elk cover requirements are achieved.

3.5. GEOLOGY, TOPOGRAPHY, AND MINERALS

Geologic resources affect the topographic features, soils, and minerals content/extent in the area, and topographic features play a major role in determining land uses and also affect hydrologic resources.

3.5.1. GEOLOGY

This section describes the existing geologic environment of the Pinedale RMPPA. Components discussed in detail include the geologic history, structure and tectonics, geologic hazards of the area, and the geologic origin of oil and gas.

3.5.1.1. Geologic History

The rocks in the Pinedale RMPPA range in age from Precambrian to Holocene (approximately 2.6 billion to present day). The total thickness of sedimentary rock above Precambrian igneous and metamorphic rocks is about 32,000 feet (Law et al. 1995). Tertiary and Quaternary deposits dominate the surficial units, with subordinate exposures of Precambrian, Paleozoic, and Mesozoic rocks. Precambrian rocks are exposed on the southwest slope of the Wind River Mountains on the eastern edge of the area. Paleozoic and Mesozoic rocks are exposed in the southwest corner of the area and in sporadic outcrops near the eastern boundary. Mesozoic rocks crop out along the western boundary and in the northern portion of the area. Depositional history of the area over the last several billion years is outlined below.

3.5.1.1.1. Precambrian Era (4.5 Billion to 544 Million Years Ago)

The Precambrian rocks in the Pinedale RMPPA are predominantly intrusive igneous and metamorphic rocks that represent a small portion of the North American Craton that formed approximately 1.6 billion years ago (Lageson and Spearing 1988). Precambrian rocks form the "basement" upon which subsequent sedimentary rocks were deposited.

3.5.1.1.2. Paleozoic Era (544 to 245 Million Years Ago)

The Paleozoic Era spans from 544 to 245 million years ago and is divided into seven periods: Cambrian, Ordovician, Silurian, Devonian, Mississippian, Pennsylvanian, and Permian.

3.5.1.1.3. Mesozoic Era (245 Million to 65 Million Years Ago)

The Mesozoic Era, sometimes called the "age of dinosaurs," spans from 245 million to 65 million years ago. The Mesozoic is divided into three periods: Triassic, Jurassic, and Cretaceous.

3.5.1.1.4. Cenozoic Era (65 Million Years to Present)

The Cenozoic Era, also known as the “age of mammals,” spans from 65 million years ago to the present day. The Cenozoic is broken into two periods of geologic time, the Tertiary and the Quaternary. Due to a more complete fossil record, the Tertiary Period can be broken down further into five epochs, the Paleocene, Eocene, Oligocene, Miocene, and Pliocene. The Quaternary Period is broken into two epochs: the Pleistocene and Holocene (our current period of geologic time).

3.5.1.2. Structure and Tectonics

The Pinedale RMPPA is located in the northwest extension of the greater Green River Basin and lies between two major structural provinces represented by vastly different structural styles. To the west, “thin-skinned” thrust faulting and associated folding characterizes structures formed during the Sevier Orogeny in Cretaceous time. This is considered “thin-skinned” because no older basement rocks are involved in the faulting. This region is commonly termed the Overthrust Belt. To the east, Precambrian basement rocks are thrust over younger rocks in “thick-skinned” thrust faulting (that is, basement rocks are incorporated into the deformation) characteristic of the Laramide Orogeny formed in Latest Cretaceous to early Tertiary time.

The western side of the area is bounded by the eastern-most faults of the Overthrust Belt. These faults mark the eastern boundaries of the Wyoming and Hoback Mountain Ranges. The mountains were formed by north-south trending thrust faults that involve kilometer-scale movement of Paleozoic and Mesozoic rocks. This thin-skinned style of faulting and deformation extends into eastern Idaho and is characteristic of the Sevier Orogeny. The Darby Thrust and the Prospect Thrust (Blackstone 1977) are the major thrust faults that extend into the area. Several other thrust fault zones border the western boundary of the area.

The eastern side of the Pinedale RMPPA is bounded by the Wind River thrust fault system. The low angle thrust faults and associated folds on the eastern side of the study area differ from the faults on the western side since they involve Precambrian basement rocks and thus represent "thick-skinned" deformation characteristic of the Laramide Orogeny.

Major structural features within the study area include the LaBarge Platform and the Pinedale Anticline. The LaBarge Platform is the northern extension of a structural feature known as the Moxa Arch. The Moxa Arch-LaBarge Platform is a structural high that extends from southwestern Wyoming to the LaBarge area where it is truncated by thrust faults from the west. The Pinedale Anticline is found in the northeastern part of the area and generally parallels the Wind River thrust fault system. The asymmetric (steeper on the west side) anticline is 35 miles long and 6 miles wide (Law and Johnson 1989). The Pinedale Anticline was probably formed by compression on the Wind River thrust fault system. The axis of the northern Green River Basin parallels the trend of the Pinedale Anticline.

3.5.1.3. Geologic Hazards

Earthquakes and landslide are the two most likely geologic hazards to affect the Pinedale RMPPA.

The Federal Emergency Management Agency and U.S. Geological Survey have classified Wyoming as having a very high seismic hazard. Although damaging earthquakes can occur anywhere in Wyoming, most of the seismic activity is located in the northwestern portion of the State. Seismic records for historical times show no major earthquakes within the area. However, nearby earthquakes may be a significant geologic hazard.

In the Pinedale RMPPA, landslide hazards are most commonly located on the western margin in the Overthrust Belt where steep slopes and variable lithotypes combine to produce significant landslide hazards. The region contains many interbedded shale units that may form significant landslide glide-planes when saturated or subject to seismic shaking. The Green River and Wasatch Formations found throughout the area contain a significant amount of weakly consolidated fine-grained material that is subject to slumping and sliding. In particular, the Wasatch Formation contains bentonite clays known to swell, contract, and fail with varying moisture input.

3.5.1.4. Geologic Origin of Oil and Gas

Crude oil and natural gas, composed chiefly of hydrocarbon compounds, are found primarily in sedimentary rocks. The earliest formed petroleum compounds tend to be very heavy, viscous oils. With increasing temperature and pressure, the heavy oils are "cracked," forming lighter oils and natural gas. The lighter constituents are more mobile and may migrate away from the rocks containing organic debris, called the "source rocks," into more porous and permeable rocks called "reservoir rocks." Oil and gas are "trapped" when they migrate to a place where further movement is barred by a structural and/or stratigraphic features, (e.g., faults, impervious beds, etc). Both source and reservoir rocks are present in the Pinedale RMPPA as evidenced by the production to date.

3.5.2. TOPOGRAPHY

The Pinedale RMPPA is located in the northern portion of the Green River Basin. The Green River Basin represents a portion of the Wyoming Basin Physiographic Province. The province consists of a 40,000-square-mile area bounded by the Middle Rocky Mountains, the Southern Rocky Mountains, and the Great Plains Provinces (Howard and Williams 1972), and is composed of structural or topographic basins bounded by mountain ranges or other physiographic features on the periphery of the province. Major basins within the Wyoming Basin Province include the Green River Basin, Wind River Basin, Powder River Basin, Bighorn Basin, Laramie Basin, and Hanna Basin. Within the major basin areas, there are numerous sub-basins.

The Pinedale RMPPA is bounded on the north by the Gros Ventre Range, on the east by the Wind River Mountains, and on the west by the Wyoming and Hoback Ranges. The northern extent of the Green River Basin comprises the majority of the area and extends to the south; the southern boundary of the Pinedale RMPPA does not follow a readily discernible topographic boundary. There is moderate relief in the area with elevations ranging from approximately 6,500 feet in the southwestern corner to above 7,500 feet along the western and northern portions of the area. Aside from the mountain fronts on the western, northern, and eastern edges of the area, mesas and buttes form the most common topographic expressions within the majority of the area. Along the mountain fronts, elevations are more extreme and range up to 9,500 feet.

Two major drainage systems traverse the area. The Green River drainage (the dominant drainage system) drains from the Wind River Mountains in the northeast through the area to the south. One major reservoir, the Fontenelle Reservoir, is located on the Green River on the extreme southern boarder of the Pinedale RMPPA. The Hoback River drainage drains to the northwest and eventually joins the Snake River but is limited to a small portion of the northwestern part of the Pinedale RMPPA. A topographic feature known as "The Rim" forms the drainage divide between the Hoback drainage to the northwest and Green River drainage to the south (Lageson and Spearing 1988).

3.5.3. MINERALS

As part of this Pinedale RMP planning effort, a Mineral Occurrence and Development Potential Report has been prepared. That study has confirmed that the most important potential mineral resources in the Pinedale RMPPA are hydrocarbon resources. The long history of natural gas production and developments in the last decade document the presence of source rocks, reservoir rocks, and trapping mechanisms that provide a significant hydrocarbon resource. Non-coalbed methane gas production has the greatest development potential; oil and coalbed methane are of lesser importance in the Pinedale RMPPA.

3.5.3.1. Primary Drilling Activity Locations

Oil and gas drilling activity in the Pinedale RMPPA has been concentrated in three regions:

- Greater Big Piney-La Barge – there are a number of fields in this vicinity that have been coalesced into one large producing area. To date, these fields (which may lie partially outside of the Pinedale RMPPA) have produced most of the oil and gas in the RMPPA. Production of carbon dioxide for use in oil production operations to enhance oil recovery also occurs in this region

- Jonah Field – as of February 2002, 384 wells have been completed in this field, with 368 of those on Federal lands. The vast majority of these wells were producing
- Pinedale Anticline – as of February 2002, there were 21 active production wells and 12 shut-in wells on the anticline. Production is increasing rapidly, with production from this field nearly doubling from the end of 2000 to February 2002.

Outside of these three areas, little exploratory drilling and development activity has occurred within the Pinedale RMPPA. Many townships have not been tested with a single well.

3.5.3.2. Importance of Federal Leasing in Oil and Gas Development

BLM-managed lands are offered for lease on a regular basis. Between 1996 and 2001, a total of 287,230 acres were offered for lease. As of April 2002, there were 1,189 Federal oil and gas leases covering 1,023,186 acres in the Pinedale RMPPA. Overall, about 77 percent of the BLM-managed land in the Pinedale RMPPA is leased.

The Forest Service managed 6 percent of all Federal leases and 12 percent of all leased Federal lands in the Pinedale RMPPA. There were no leases on land managed by the Bureau of Reclamation. Only leasing within the BLM-managed lands is included as a part of this Pinedale RMP planning process.

It is anticipated that as many as 3,150 new non-coalbed gas wells may be drilled in the Pinedale RMPPA in the 2001 to 2020 period, with an average rate of about 150 wells per year. This estimate does not include recompleting wells to new formations or zones, plugging back wells to test shallower formations or zones, or re-entering wells to drill deeper.

New drilling will mostly take place on leases located on BLM administered lands. Future production of natural gas resources is characterized within the Pinedale RMP Mineral Occurrence and Development Potential Report as follows:

- High development potential is anticipated in the area surrounding Jonah Field and the Pinedale Anticline
- Moderate development potential is anticipated in a large area on the La Barge Platform and in the central and north parts of the Pinedale RMPPA

- The oil and gas industry will search diligently for another Jonah-type field if access to Federal lands through leasing is sufficient. There will also be extensive areas with little or no drilling activity.

3.5.3.3. Coalbed Methane Drilling

The presence of methane in coal seams has long been recognized as a potential hazard in the mining of coal. The extraction of methane from coal was originally practiced to provide a margin of safety for coal mining by removing as much methane as possible prior to mining. It was then recognized that there was a potential significant gas resource in coals. In order to extract the gas from coal resources, it is necessary to lower the hydrostatic pressure in the coal. Lowering the pressure is accomplished by producing the water that is within the coal seam. Extraction of the gas often involves the pumping of large amounts of water in the initial stages of development. The quality of the extracted water resource varies. Water disposal options, which are highly dependent on water quality and economics, can include discharge to the surface or subsurface injection into disposal wells or in aquifer recharge wells. Surface disposal options may require pre-treatment prior to disposal to meet discharge permit requirements. All disposal options require permits.

CBM drilling activity in the Pinedale RMPPA is at a very early stage. Infinity Inc. operates a five well coalbed methane pilot project in the Riley Ridge Field area of T29 and 30N, R114W. Drilling depths appear to be between 3,400 and 4,100 feet. Although these five wells show promise, it is very difficult to estimate large-scale development based on available information at this early stage of development. Within the Pinedale RMP Mineral Occurrence and Development Potential Report, it is estimated that up to 270 CBM wells could be drilled between 2001 and 2020.

3.5.3.4. Other Minerals

The development potential of non-fluid minerals within the Pinedale RMPPA (e.g., minerals other than oil and gas) is seen to be limited due to a variety of factors. First and foremost, the surficial geology of the area, being of a primarily sedimentary nature, limits significant occurrences of mineralized zones. Secondarily, where mineralized zones have been determined to be present, the occurrences have generally been defined as exhibiting characteristics such as limited or discontinuous mineralization and/or inherent impurities and/or low percentage content of the target mineral.

Those non-fluid minerals that are known to occur within the Pinedale RMPPA, and which are simultaneously or projected to be in demand, are limited to aggregates (e.g., sand and gravel) and decorative stone (both moss rock and boulder). Each of these commodities is considered to be an industrial mineral by definition, and each has a relatively low per-unit valuation. With low per-unit value commodities, the market area for consumption is generally highly localized and, therefore, sensitive to transportation costs.

3.6. HEALTH/SAFETY AND HAZARDOUS MATERIALS

Health and safety threats within the Pinedale RMPPA may affect workers, recreationists, or wildlife. Personal injury and exposure to hazardous materials are the common threats to health and safety in the Pinedale RMPPA.

As described in Section 3.3, wildfires remove existing vegetation and pave the way for new forests. Although wildfires are a natural process, large-scale wildfires could cause undesirable ecological, economic, and social impacts. Therefore, commercial timber harvesting and occasional prescribed burning are conducted by the BLM as a means of replacing existing forest stands. Timber harvesting and prescribed fires mimic natural wildfires with a reduced potential for negative effects, such as health and safety threats to nearby residents, destruction of homes and communities, and harm to wildlife. Prescribed burning of sagebrush communities removes decadent stands, produces diverse age stands, and renews forage production in sagebrush, grassland, and forbs. At the same time, excessive fuels are removed, thus reducing the chance of fire that becomes out of control and endangers health and safety.

The primary hazard associated with the exploration and development of oil and gas is exposure to hydrogen sulfide gas. Leaks of hydrogen sulfide, a toxic byproduct of oil and gas drilling that attacks the central nervous system, have the potential to injure nearby human or ecological receptors. Because the locations of the oil and gas fields within the Pinedale RMPPA are not readily accessible to public access, the threat of exposure to hydrogen sulfide gas by humans usually includes workers only. Water discharges from oil and gas wells can be point sources of water pollution. Groundwater with increased metals and other constituents is pumped and sometimes disposed to the surface in pits, creating increased runoff and contaminated sediment that can potentially reach local waterways. Hazardous materials, such petroleum hydrocarbons, caustics, methanol, etc., could possibly be released during exploration and development for oil and gas or coalbed methane. Hazardous materials potentially used or produced during construction, drilling, production, and reclamation operations associated with the oil and gas and coalbed methane industries are listed in Table 3.6-1. Accidental hazardous material spills or pipeline ruptures could adversely impact air, soils, and surface water, and pose an exposure threat to nearby humans and wildlife.

Activities associated with livestock grazing operations are generally limited to moving cattle, horses, or sheep through the area for grazing opportunities, along with upkeep of range improvements, such as corrals, fencing, water developments (reservoirs, spring developments, pipelines, wells, etc.), and land treatments (prescribed fire burns, herbicide treatments, mechanical treatments, etc.). To accommodate livestock grazing and repair of range improvements, permittees travel through the Pinedale RMPPA on designated roads or trails in vehicles, horseback, or on foot. Health and safety hazards associated with livestock grazing operations on BLM-managed land within the Pinedale RMPPA are limited to the potential for accidents during travel through the area, and typical construction-related hazards associated with repair of range improvements.

Recreational activities commonly pursued in the Pinedale RMPPA include hiking, fishing, hunting, camping, and sightseeing. OHV travel is the primary method for accessing recreation areas, and it is increasingly considered a recreational activity in itself. Health and safety threats from recreational activities include the potential for vehicular accidents during OHV travel. The steep slopes found in some OHV areas create especially hazardous driving conditions. An additional health and safety hazard associated with recreation is the threat of injury associated with hunting accidents.

3.7. LANDS AND REALTY

The majority of the Pinedale RMPPA (surface and mineral) is comprised of solid blocked public lands owned by the Federal government. The land is used for a wide variety of purposes, and it is common for conflict among competing land uses to occur within the Pinedale RMPPA.

3.7.1. LAND OWNERSHIP AND CONTROL

The lands ownership/control situation was previously summarized in Table 1.1-1. Land status is also shown in Figure 3.7-1. The Pinedale RMPPA addresses only those lands within Sublette and Lincoln counties that are administratively controlled by the BLM (about 928,000 surface acres). All of the mineral estate underlying National Park Service and Forest Service lands are also administered by the BLM. Much of the private lands had the mineral estate (either all of the minerals or portions of the minerals) reserved to the U.S. Government. In these cases, the mineral estate is administered by the BLM although the surface estate is administered by those respective agencies and private landowners. The total BLM-administered Federal mineral estate covered by this RMPPA is about 1.14 million acres.

As provided by the *Federal Land Policy and Management Act* (FLPMA), the BLM has the responsibility to plan for and manage public lands under its administration. As defined by FLPMA, public lands are those Federally owned lands, and any interest in lands (e.g., Federally owned mineral estates), that are administered by the Secretary of the Interior, specifically through the BLM. The land surface (and mineral ownerships) within the Pinedale RMPPA are varied and intermingled; consequently, so are the administrative jurisdictions for land use (and minerals).

Land and realty program objectives are: 1) manage the public lands to support goals and objectives of other resource programs; 2) respond to public demand for land use authorizations; and 3) acquire administrative and public access where necessary.

3.7.2. METHODS OF PUBLIC LAND MANAGEMENT

There are several methods of public land management that must be considered in the RMP process, including Land Tenure Adjustments (e.g., disposals, acquisitions, withdrawals), rights-of-way (ROWs), and permits/leases. Issues relating to access are discussed under Transportation and Access (Section 3.14).

3.7.2.1. Land Tenure Adjustment

There are several categories of land tenure adjustment with the purpose of disposal, acquisition, or retention of property.

3.7.2.1.1. Disposal

Public lands are retained in Federal ownership with the exception of those lands that have future potential for disposal (i.e., sale and/or exchange). Public lands have potential for disposal when they are isolated and/or difficult to manage. Disposal actions are usually in response to public request or application that results in a title transfer, wherein the lands leave the public domain. All disposal actions are coordinated with adjoining landowners, local governments, and current land users.

Public sales are managed under the disposal criteria set forth in Section 203 of FLPMA. Public lands determined suitable for sale are offered on the initiative of the BLM. The lands are not sold at less than fair market value. Public lands classified, withdrawn, reserved, or otherwise designated as not available or subject to sale are unavailable. Any lands to be disposed of by sale that are not identified in the current RMP require a plan amendment.

Land exchanges are initiated in direct response to public demand or by the BLM to improve management of the public lands. Lands need to be formally determined suitable for exchanges. In addition, lands considered for acquisition would be those lands that meet specific land management goals identified in the RMP. Non-Federal lands are considered for acquisition through exchange of suitable public land, on a case-by-case basis, where acquisition of the non-Federal lands will contain higher resource values than the public lands being exchanged.

In all exchanges, effort is made to keep the surface and mineral estate intact on both the lands disposed of and acquired, where possible, since split estate situations could be problematic.

3.7.2.1.2. Acquisition

In addition to acquiring non-Federal lands through land exchanges, BLM Pinedale Field Office could acquire lands, water, and interest in lands by direct purchase and by donation.

3.7.2.1.3. Withdrawals

Withdrawals are parcels of land that are taken out of the available acreage open to resource use and/or extraction. This is done to protect a threatened or endangered species, a cultural site, or a developed recreation area from mining laws. A withdrawal provides the maximum protection in terms of land uses and protection from mining claims. These withdrawals are relatively small in terms of acreage and are site specific.

3.7.2.2. ROW/Corridors

Rights of way (ROWs) or corridors are preferred routes for transportation and transmission facilities. The majority of ROWs in the Pinedale RMPPA are for county and BLM-managed roads, electrical and telephone lines, and pipelines. To the extent possible, linear ROWs such as roads and pipelines are routed where impacts would be least disturbing to environmental resources, taking into account point of origin, point of destination, and purpose and need of the project. Although there are established corridors (Figure 3.7-3), this does not preclude location of transportation and transmission facilities in other areas, if environmental analysis indicates that the facilities are compatible with other resource values and objectives. Further identification of corridors may not necessarily mandate that transportation and transmission facilities will be located there if they are not compatible with other resource uses, values, and objectives in and near the corridors, or if the corridors are saturated. ROWs are generally issued with surface reclamation stipulations and other mitigating measures. Restrictions and mitigating measures may be modified on a case-by-case basis, depending on impacts to resources. Areas closed to mineral leasing, having a no surface occupancy (NSO) restriction, or otherwise identified as unsuitable for surface disturbance or occupancy are generally avoidance or exclusion areas for ROWs.

3.7.2.3. Leases and Permits

Section 302 of FLPMA states that public lands may be authorized to state, local, and private citizens to use, occupy, or develop. These uses of public lands include agricultural development, residential use (under certain conditions), commercial use, advertising, and National Guard uses. Permits are usually short-term authorizations not to exceed 3 years. Leases are long-term authorizations that usually require a significant economic investment in the land. Temporary use permits are considered for areas to be used only during construction or for other short-term needs.

3.8. LIVESTOCK GRAZING

This section addresses grazing management as it pertains to livestock. The grazing use by wildlife is difficult to regulate at this broad level. As a result, livestock grazing allotments in known critical winter range and other important wildlife use areas receive analysis on a case-by-case basis to address forage allocation issues.

Since 1997, the Pinedale RMPPA, along with the rest of the Intermountain West, has been in a state of drought. The drought can and has affected the productivity of the vegetation and the availability of water (Laster 2002c, Holecheck et al. 1998). Due to the conditions caused by the drought, the drought is the driving force behind the current resource situation and many recent management decisions.

3.8.1. HISTORY AND SETTING

The BLM Pinedale RMPPA was settled by ranchers and pioneers by the early 1900s. The Pinedale RMPPA was well suited for grazing with accessible forage and water. The ranchers settled in the valleys to use the available water from the rivers and streams for culinary and irrigation purposes. Many of the meadows were irrigated to provide hay for the livestock through the winter.

Cattle and sheep ranching were well established on private and public lands before the passage of the Taylor Grazing Act in 1934. Until 1934, the area was grazed in common at a first-come, first-serve basis. The Taylor Grazing Act established regulations and the predecessor agency to the BLM to oversee the use of the public rangelands. The Taylor Grazing Act brought many changes to grazing management, including allotment boundaries, allowable stocking levels and a permitting process. The early allotment boundaries were established using geographical boundaries, and permitted Animal Unit Months (AUMs), were established on the basis of the type and number of animals a rancher was grazing. Initially, the Pinedale RMPPA was mostly unfenced. After the 1930s, request to fence smaller areas within the large allotments occurred. By the 1960s, many individual allotments were fenced.

The majority of the rangelands in the Pinedale RMPPA were surveyed in the early 1960s to determine their carrying capacity. The methods used were ocular reconnaissance and professional judgment. Using the results from the survey, the Pinedale Field Office re-established grazing allotment boundaries, allowable AUMs, and set the general season of use. The area was modified into 207 allotments, with carrying capacities ranging from 3 AUMs to 14,000+ AUMs. In total, the BLM Pinedale Field Office manages 931,000 acres of public land, of which 909,593 acres are managed for livestock grazing (BLM 1988).

Although the present allotment boundaries are very similar to the boundaries established in the 1960s, there have been some changes. Due to management potential or ownership, allotments have been combined or split. The range specialist along with other resource specialists and affected parties approved the changes. BLM-managed lands provide 107,536 AUMs, state lands provide approximately 7,000 AUMS, and private lands provide approximately 24,000 AUMs within the Pinedale RMPPA. These additional AUMs are utilized for grazing and recognized under an exchange-of-use grazing agreement. Exchange-of-use is either depicted as a separate license or as a percent Federal Range figure on the individual license.

The Pinedale RMPPA is grazed by cattle, horses, and sheep. The majority of the AUMs are allocated to cattle, which use 97 percent of the available AUMs. Horses make up almost 3 percent of use and sheep make up less than 0.1 percent of use. Several of the allotments include private, state, and Forest Service lands in addition to BLM-managed lands. Typically, cattle are moved from the private base land to the BLM-managed land in the spring. By summer, the cattle are moved from the BLM-managed allotments to the Forest Service allotments. In the fall, the cattle are trailed back to the base lands so the livestock can be fed during the winter.

Most of the BLM permits are issued for spring use. The Forest Service permits are used in the summer and early fall. Private land use is typically in the winter. There are several small allotments in the Pinedale RMPPA that consist of only a small acreage of BLM-managed land in relation to the private land used. Federal management of this type of allotment incurs a disproportionately high cost. Thus, there are no season restrictions for these allotments. The permittees can graze such allotments at their discretion as long as “overuse and deterioration does not occur on Federal range.” To assist in management of some allotments, Allotment Management Plans (AMPs) were developed. Currently, there are 13 completed AMPs for the Pinedale RMPPA.

3.8.3. STANDARDS AND GUIDELINES

On February 22, 1995, the Secretary of the Interior developed four fundamentals of Rangeland Health. This means that the following conditions must exist on BLM-managed lands:

- Watersheds are in, or making significant progress toward, properly functioning physical condition, including their upland, riparian–wetland, and aquatic components; soil and plant conditions support infiltration, soil moisture storage, and the release of water that are in balance with climate and landform and maintain or improve water quality, and timing and duration of flow
- Ecological processes, including the hydrologic cycle, nutrient cycle, and energy flow, are maintained, or there is significant progress toward their attainment, in order to support healthy biotic populations and communities

- Water quality complies with State water quality standards and achieves, or is making significant progress towards achieving, established BLM management objectives such as meeting wildlife needs
- Habitats are, or are making significant progress toward being, restored or maintained for Federal threatened and endangered species, Federal-proposed species, Categories 1 and 2 Federal candidates, and other special status species.

To achieve the four identified fundamentals of rangeland health outlined in the grazing regulations (43 CFR 4180.1), Wyoming BLM developed six standards for healthy rangelands and nine guidelines for achieving appropriate livestock grazing management. The standards address the health, productivity, and sustainability of the BLM-administered public rangelands. The standards represent the minimum acceptable conditions for public rangelands in Wyoming. The nine guidelines direct the proposed management change. If an area is not meeting one of the standards, then management changes are implemented according to the guidelines.

3.8.4. LIVESTOCK ALLOTMENTS AND USAGE

Since the creation of allotments in the 1960s, some of the boundaries have changed. Many of the small allotments that were created during the adjudication process have been transferred to private ownership. These allotments were typically small portions of public land fenced-in with private land, thus disposed of under the Unintentional Trespass Act. This act allowed landowners to apply for ownership of the included parcels until it expired in the 1960s. In addition, some of the larger allotments have been split into smaller allotments.

The Pinedale Field Office initiated a new allotment numbering system in 2002 due to a change in computer software. The allotment names used since 1988 have not changed, but the 4-digit allotment code has been replaced with a 5-digit code. The allotment name is usually used in discussions so all the tables and references are typically alphabetized by allotment name instead of by sequential number.

Some allotments have been created and deleted since the 1988 RMP (BLM 1988). A permittee(s) can request to have the boundaries changed, or the BLM can change the boundaries. The changes are approved if boundary change will improve management options. The Desert Common Allotment was split into four allotments: Alkali Draw (No. 20001), Blue Rim Desert (No. 12029), South Desert (No. 02040), and Sand Draw (No. 02156). The Round Valley Rye Grass Common was renamed Aspen Ridge (No. 22006) because it became an individual allotment. Web Draw pasture (No. 02101) lost acreage to the Reservoir allotment (No. 02103) and was split into two individual allotments: Web Draw and Web Draw Pasture (No. 02101). The two Hot Springs allotments were combined into the Hot Springs Pasture (No. 02157). The Bench Corral Inv. Allotment (No. 02062) lost acreage to the Lander Cutoff Allotment (No. 32224). The Rathburn Allotment (No. 02138) was divided into two allotments: the Rathburn (No. 02138) and Rathburn North (No. 22030) allotments.

The allotments in the Pinedale RMPPA encompass large amounts of land. Many wildlife species use and depend on the vegetation resource within the allotments. The Big Piney/LaBarge area is composed of a large amount of crucial mule deer winter range; grouse habitat; and critical elk winter ranges. Due to the variety of land uses (livestock; wildlife; and oil, gas, and mineral development), the range resource has been declining. There is increasing competition for the forage resource among the uses.

Approximately 30 percent of the allotments have been evaluated using the six standards to determine their condition. A map is created yearly to show the status of the evaluated allotments. The evaluation results and map are kept in the Pinedale Field Office files. The six standard evaluations are taking the place of the ecological condition surveys. An ecological condition inventory took place in the mid 1980s using professional judgment. Results for the Pinedale RMPPA indicated that 5,609 acres were at the potential natural community; 479,170 acres were in late seral stage; 420,5571 acres were in mid seral; 16,751 acres were in early seral stage; and 9,529 acres were undetermined. The categories used in the survey are equivalent to the traditional excellent, good, fair, and poor classifications. The excellent, good, fair and poor conditions were based on forage conditions and not ecological condition of seral stages.

Riparian areas within the Pinedale RMPPA create a particular problem for grazing management. The riparian areas receive heavy use by livestock because water is available and the vegetation remains green throughout the grazing season. Shrub scrub wetlands also provide shade. Many of the wetland areas are located along the foothills of the mountains. Fencing all the riparian areas to reduce the grazing pressure on them is impractical; however, key riparian areas that were receiving heavy use have been fenced. In addition to employing fencing, management tools such as salt placements and herding has decreased the concentration of use on riparian areas.

To assess the riparian areas within the allotments, the Proper Functioning Condition (PFC) method is used. The PFC considers hydrology, vegetation, and soil/landform attributes to determine the overall health of a riparian-wetland area. This method provides information on whether or not a riparian-wetland area is physically functioning in a manner that will eventually allow for the maintenance or recovery of desired values (e.g., fish habitat, neotropical birds, or forage). Streams are separated into three categories: properly functioning, at risk, and not functioning. There are at least 676 miles of lentic and lotic riparian areas within the Pinedale RMPPA. Since 1994, over 90 percent of the riparian areas within the allotments have been assessed once using the PFC method. The completed PFC evaluations have revealed that many allotments contain riparian habitat that is at risk. Those allotments rated as functioning at risk and having a non-apparent declining trend are in need of additional monitoring to determine factors contributing to the risk situation.

In the late 1980s, the BLM evaluated the potential grazing pressure in each allotment. Water availability and slope measurements were used to determine the livestock use areas. A map was created for each allotment depicting high and low use areas. These maps are kept in the allotment files in the Pinedale Field Office.

3.8.4.1. Designated Management Categories and AMPS

Three management categories for allotments have been developed: C (Custodial), M (Maintain), and I (Improve). These categories help identify the significance of existing or potential resource conflict and the opportunity for improvement of the current condition. Public input was sought in the development and establishment of the criteria for the three categories. Individual allotments were prioritized based on interviews with permittees, field evaluation by BLM personnel, and identified resource use conflicts. The information received from the permittees and professional judgment was used to place each allotment into a category in 1988 (Figure 3.8-1). The criteria have stayed the same since 1988, but there is interest in adding new criteria.

Allotments are now evaluated using the six standards in addition to the established criteria. If one or more standard is not met, then the allotment is placed in the "I" Category (unsatisfactory condition with large resource conflicts). Site-specific quantifiable goals are then developed for the I Category allotments. Twenty-six allotments, which encompass 20,878 acres of public land, were determined to be in the C category; 147 allotments (475,802 acres of public land) were determined to be in the M category; and 40 allotments (556,966 acres of public land) were determined to be in the I category (BLM 1988).

According to the 1988 RMP, allotment management plans (AMPs) were to be created for all allotments in Category I. Since 1988, two AMPs have been created and implemented, and three AMPs have been revised. AMPs for the Spade (No. 02072) and South LaBarge (No. 22005) allotments were created and implemented. The Desert Common was revised to address the creation of four individual pastures from the Common allotment. The Upper North LaBarge and North LaBarge Common (No. 02077) were revised to address season of use improvements. The AMPs are maintained in the central files of the Pinedale Field Office.

AMPs are used to address the identified management concerns for an allotment. The AMP provides recommendations such as: develop a water source or change the season of use to help solve the management concern. Most of the AMPs were developed in the 1960s and 1970s. Because 20 to 30 years have passed since completion of the AMPs, many may no longer be useful or adhered to (Laster 2002c). Complete evaluation of the AMPs has not been done. Through the range standards evaluation, effectiveness of the AMPs will be evaluated. The AMPs that have been implemented address cattle grazing. Approximately 40 percent of the acres involved with grazing are managed through an AMP.

AMPs are considered activity plans; therefore, an EA must be completed before an AMP is implemented. Because of the time and resources needed to complete an AMP, it has become an ineffective method. Grazing systems and adjustments in the season of use are still needed and can be done without an AMP. The Budd Fish Creek allotment is managed using a cooperative management plan with the Forest Service and the Natural Resource Conservation Service.

3.8.4.2. Licensed Use

There are three types of AUMs: maximum preference, suspended use, and active use. Maximum preference is the maximum allowable use for that allotment. The suspended use value gives permittees in an allotment a priority if additional AUMs are reinstated. The active use AUMs are the AUMs that the permittee pays for each year. The smaller allotments are typically used to the full capacity, whereas the larger allotments with more AUMs are not normally used at the maximum preference level. The maximum preference and the longest grazing season are determined in the permit on a 10-year basis. If the maximum preference is used, cattle are allocated 104,097 AUMs, horses 3,194 AUMs, and sheep 245 AUMs. Modifications such as a temporary decrease in AUMs or grazing season due to drought occur when the permit is issued annually. In 2002, the permitted number of AUMs was 25 percent less than normal due to the drought.

Within the Pinedale RMPPA, there are two types of allotments: individual and common allotments. The individual allotments are allocated to one permittee. The common allotments are usually large in acreage and contain livestock from two or more livestock operators or permittees. There are 26 common allotments and 187 individual allotments in the Pinedale RMPPA. Management polices are the same for individual and common allotments.

Currently, approximately 125 different permittees use public lands in the Pinedale RMPPA for a portion of their operation. The number of allotments per permittee varies from one allotment to 12 allotments. Of the 213 allotments, 197 are cattle operations, 15 have either just horses or both horse and cattle operations, and 1 allows sheep grazing.

Most of the operations are cow/calf operations. A few of the ranches have switched to yearling operations to better use the available forage, and some run yearlings in addition to a cow/calf operation. There is concern about the current level of licensed use because of the removal of forage by oil and gas development. Some allotments may be over allocated.

Licensed use may be converted between types of livestock. Historically, most of the conversions have been from sheep to cattle. Conversion from one type of livestock to another is evaluated on a case-by-case basis (including development of an Environmental Assessment). In critical deer and antelope winter areas, conversion from cattle to sheep is not allowed due to wildlife concerns. Converting the AUMs between cattle and horses is common and does not pose a concern because both species use similar forage. There have not been any requests to convert cattle AUMs to exotic species such as buffalo at this time. There are still approximately 20,000 acres that are unallocated, but are suitable for grazing. Available AUMs may be allocated to grazing once the AUMs are quantified. Some requests have been made to allocate a few AUMs. The requests are currently being addressed, but no additional AUMs have been allocated.

3.8.4.3. Season of Use

Of the 213 allotments in the Pinedale RMPPA, 73 do not have a restricted season of use. These 73 allotments are small in size, supporting three to 256 AUMs. The other allotments have a restricted season due to vegetation, wildlife, or other use requirements. Season-long use inherently causes concern about the resource. However, some of the allotments designated as season-long grazing are only used for a short period of time. These are small allotments that are permitted with the stipulation that the permittee may graze anytime as long as there is no overuse of the public land. Most of the use in these allotments occurs on the private land. The season of use is designated in general terms in the permits issued every 10 years. The exact turn in and turn off dates for each year are weather-dependent. In some of the allotments, cattle are permitted for a short time, while horses are permitted for a longer time. This has not been a problem because the domestic horse numbers have been low. Since the 1988 RMP, there have been some changes in the allowed season of use.

There are some concerns with the current season of use. Due to variations in weather, the turn in dates for the Forest Service allotments are sometimes delayed. This delay causes an extended use of the BLM-managed allotments. There is a lot of coordination and cooperation between the Forest Service and the BLM offices in determining the range readiness for the allotments and determining coinciding turn off and turn in dates. Also, the May 1 turn in date is usually too early, and the vegetation has not reached the "range readiness" state with the only available forage being last year's stubble and the new growth. This combination results in the new growth being eaten, and the plants never maturing. There are indications that the desert allotments having a May 1 turn in date are declining in range condition.

3.8.4.4. Cattle

Most of the livestock are wintered on private lands. In the spring, the private lands need to be rested and/or irrigated for hay, so the permittee utilizes BLM-managed lands. The major season of use for the cattle is May and June in the lower elevation (<7000 feet) BLM-managed allotments. The high elevation allotments (<7000 feet) are typically used next in the grazing pattern. The Forest Service controls most of the high elevation allotments, but there are a few BLM-managed allotments that border the Forest Service lands and are used like a high elevation allotment. In general, the Forest Service allotments and other high elevation allotments allow livestock in late June, depending on the year. Most of the permittees have their livestock on the high elevation allotments by mid-July. The livestock remain on the higher elevation allotments until the fall (September). The livestock are then trailed or drifted across the BLM-managed allotments to the private base land for winter.

Due to the distance between private land and the allotments managed by the BLM and Forest Service, cattle are trailed or drifted to the desired location. The livestock in the Pinedale RMPPA are trailed across BLM-managed land and highway rights-of-way (ROWs). The trailing activities are authorized on a case-by-case basis. Most of the trailing activities involve the permittees going from the base ranches to the allotments, or visa versa. There are two stock driveways on BLM-managed land. The Cora stock driveway (SDW) goes from the Cora Y SDW west of Pinedale to the Forest Service lands on the upper Green River area north of Pinedale. The Silver Creek SDW is within the Cottonwood common allotment (No 02097). The Silver Creek SDW provides a trail from the BLM-managed lands to the Forest Service allotments to the east.

The Upper Green Cattle Association's yearly cattle drive from base ranches to allotment and back is an important trailing activity. The Association trails approximately 7,000 head of cattle to the Forest Service allotments in June and then back to base ranches in September/October. Around 28 permittees are involved. The cattle drive starts in the southern desert area in May and moves the cattle to summer range in the mountainous Forest Service lands to the north. The designated stock driveway is over a 2-week period. Cattle are driven through "Trapper's Point." It takes approximately 1 month to move cattle from their mountain summer range back to their winter range. The holding pasture at the Cora Y is an essential gathering point. Due to time constraints, some permittees use trucks with trailers to move the cattle to and from the allotments.

3.8.4.5. Horses

Several allotments in the Pinedale RMPPA receive use by domestic horses. The season of use is typically May through November. Many of the horse permits are for draft horses and brood mares. The draft horses are used for winter-feeding operations, and the brood mares provide horses for ranch work or sale.

3.8.4.6. Sheep

Sheep use is minimal within the Pinedale RMPPA. There is only one active sheep permit. The sheep permit for 190 sheep during June in the South LaBarge Common Allotment (No 22005) was terminated. Currently, the single grazing permit allows for 800 head of sheep. The grazing occurs in the Square Top Allotment (No. 02051) in May and June. During the rest of the year, the sheep herd is grazed in the BLM-managed Big Sandy allotment. The permittee has applied for a conversion of these AUMs. The

Pinedale Field Office is evaluating the request and preparing an EA. If the conversion is approved, there will be no sheep grazing within the Pinedale RMPPA.

3.8.5. RANGE IMPROVEMENTS

Range improvements in the Pinedale RMPPA include wells, springs, reservoirs, fences, cattle guards, corrals, and vegetation manipulation. Range improvements help distribute the livestock and prevent unauthorized use. The range improvements by allotment are documented in the allotment files in the Pinedale Field Office. The benefiting user is responsible for the maintenance of the range improvement. In most cases, the permittees are responsible for the structural improvement maintenance and the BLM is typically responsible for the vegetation manipulation maintenance. The implementation of range improvements is designed and constructed to minimize adverse environmental impacts and maximize function and cost effectiveness (BLM 1988). Range improvements are prioritized by allotments and by watershed. The allotments in the I category are typically the allotments that receive the most monies for improvements. All range improvements follow the standard operating procedures for range improvements and vegetation manipulation presented in the 1988 RMP (BLM 1988). Projects proposed on BLM-administered lands are evaluated on a case-by-case basis for affects on soil and water resources. Endangered species and species habitat are given priority for protection from adverse impact. If range improvements conflict with achieving or maintaining riparian function, then the improvements are located away from riparian areas.

3.8.5.1. Water Developments

Water projects are the most numerous and beneficial to livestock distribution. The majority of the water developments were put into place in the 1960s and 1970s. Currently, there are 492 water developments, 45 springs, 113 wells, 308 reservoirs, and 26 others. Major water source locations are shown in Figure 3.8-2. There have been a few new water developments since the 1988 RMP. Springs are improved as water sources by exposing the aquifer and collecting the water in a head box or central point. Most existing springs are already developed, and need regular maintenance. Wells are typically drilled in areas where other water sources are not feasibly developed. Wells usually provide water year-round. There is some opportunity for more wells, and/or the use of the water wells associated with the oil and gas development. Reservoirs are constructed by using the native soils to form a dam or dike across drainages. They are designed to catch the permanent or seasonal runoff. Rain catchments are part of the other category. Many rain catchments were installed in the past to collect rainwater into stock tanks. Few of the catchments worked, and most have been removed.

The availability of water is crucial to effective livestock distribution. Misplaced and mismanaged water developments often create areas of over use and non-use. The condition of many water developments is unknown. A reasonable assumption is that the wells are in good condition but many of the reservoirs may be degraded (Laster 2002c). Reservoirs have been neglected in many allotments, resulting in reservoirs that are washed out or silted in. The springs and reservoirs provide potential water sources year round to cattle and wildlife, depending on the water availability. The wells are turned on while the cattle are in the allotment, and turned off when the cattle are moved from the allotment. When the cattle leave, wildlife can no longer use the wells. Because of this issue, the BLM provides maintenance to five wells in the desert area. The BLM turns the wells on in early spring and keeps them open until late fall. The wells provide important water sources for antelope and other desert wildlife. Other forms of range improvements that assist with cattle distribution are fencing, salt placement, and vegetation manipulation. In the Pinedale RMPPA, fencing occurs to create pastures and provide management boundaries. In contrast to open range, the Pinedale RMPPA is considered a closed range. Fencing along the major roadways and of individual grazing allotments is maintained to control cattle drift and to direct cattle drift between summer and winter range. Stock driveway fencing is also maintained between summer and winter range. Fences also separate individual allotments into pastures to provide more management options (BLM 1988). Fences are constructed to limit adverse impact to wildlife. The design of the fences varies due to the type of wildlife involved (BLM 1988). Steel posts are spaced a minimum of 16.5 feet apart, and wooden braces can be placed 0.25 mile apart. In addition, fencing is used on a site-specific basis to achieve management goals. For example, a riparian area or exclosure may be fenced off to achieve the desired results. Salt is also required to be at least 500 feet from a water source to reduce grazing impacts.

3.8.5.2. Vegetation Manipulation

Vegetation manipulation occurs to improve forage production and water runoff, as well as to be of benefit to wildlife. Many projects occurred in the mid 1960s to early 1970s. The majority of these vegetation treatments were focused on decreasing the sagebrush and increasing forage availability. A few vegetation manipulations occurred in the 1980s and 1990s. The purpose for each of the vegetation treatments since 1988 involved breaking up even aged stands of sagebrush and improving conditions for big game winter range, as well as temporarily increasing forage for livestock. The sagebrush treatments in the 1960s and 1970s occurred by spraying chemicals such as Spike, or 2-4-D oil emulsion sprays. The life expectancy for a chemical treatment is 10 to 12 years. Most of the treated areas are older than 12 years, so sagebrush has reestablished. The 2-4-D oil emulsion treated areas were the least successful.

Some mechanical treatments have also been completed. Plowing and reseeding efforts have been completed, but success has been minimal. The poor response to these treatments may be due to the soil type and location. Today, the preferred treatment method is prescribed burning.

Numerous range improvements in the Pinedale RMPPA are in need of maintenance or initiation with the largest number being reservoirs. The water projects are the most crucial in an allotment. Water availability dictates how well the livestock are distributed. In addition, projects for vegetation manipulation of single age class stands of sagebrush are needed to benefit livestock and wildlife. In the 1988 RMP, 98,552 acres were identified as being suitable for vegetation treatment (BLM 1988). The areas identified for treatment did not take into account restrictions on treatable areas. Today, there are restrictions regarding wildlife and watershed values, which will decrease the number of acres that can be treated. These restrictions, as well as time and finance restrictions, allow much less land to be treated. Since 1988, a total of 8,700 acres have been burned, 3,660 acres had herbicide applied for brush control, and 4,440 acres have been treated mechanically (see Table 3.8-1 for locations). There are still many areas that are suitable for vegetation treatments for the benefit of wildlife and livestock.

3.9. OFF-HIGHWAY VEHICLE USE

Off-highway vehicles consist of vehicles that travel over land on routes other than designated roads or highways. The varied landscape, the large area open to OHV use, and the numerous landforms along the northern, eastern, and western boundaries of the resource Pinedale RMPPA (which are composed of the foothills and approaches to the Gros Ventre Range, the Wyoming Range, and the Wind River Range) provide numerous opportunities for OHV use. This varied landscape and the proximity of and access to the Forest Service-managed lands within the Bridger National Forest and Teton National Forest have contributed to the popularity of this type of vehicle use.

3.9.1. OHV USE DESCRIPTION

OHVs are used within the area for both recreational and non-recreational use. Much of the non-recreational OHV use is in the form of four-wheel drive (4WD) pickup trucks driven by local ranchers, oil and gas developers, land surveyors, and geological surveyors performing seismographic studies. During the winter months, non-recreational use includes snowmobile use for these same activities. Recreational OHV use includes such non-winter 4WD pickup activities as wood gathering, antler collecting, hunting, and sightseeing. Other OHVs, such as recreational three-wheelers, motorbikes, and all-terrain vehicle (ATV) may be used for these same recreational activities. Snowmobiles are the most common recreational OHV used within the area, and the use season runs approximately from December through April. The eastern side of the Pinedale RMPPA, along the lower slopes of the Wind River Range, has a snowmobile trail system that provides opportunities for spectacular, scenic views of the surrounding mountains and dense forests. To the west, there are many access points to the Wyoming Range that also provide OHV recreational opportunities for viewing scenery and enjoying deep snow. Motorcycle and ATV use is becoming more popular within the area, but the use season is fairly short, running from May through September (BLM 1988; Wyoming Department of State Parks 2002).

OHV use is continuing to grow within the Pinedale RMPPA. As identified in the BLM's National Management Strategy for Motorized Off-Highway Vehicle Use on Public Lands (BLM 2001), the growth in OHV use can be attributed to the following:

- Greater public interest in unconfined, outdoor recreational opportunities
- A rise in the amount of disposable income, fostered by a healthy domestic economy, for use in recreational pursuits
- Advances in vehicle technology that enable motorized OHV users to reach previously inaccessible areas
- The rapid expansion and population growth of cities and suburbs in the western states has brought Westerners closer to once-remote public lands
- A population with an increasing median age with changing outdoor recreational interests.

3.9.2. OHV USE AND TRENDS

The entire Pinedale RMPPA is designated as either "open," "limited," or "closed" to OHV use, as described below:

- Open - an area where all types of vehicle use is permitted at all times, anywhere within the designated "open" area
- Limited - an area restricted at certain times of the year, in certain areas, and/or to certain types of vehicles
- Closed - an area where OHV use is prohibited. Use of OHVs may be allowed for certain reasons, subject to approval by the BLM authorizing officer.

OHV designations within the Pinedale RMPPA apply to all OHVs, with the exception of emergency vehicles, regardless of the purpose for which they are to be used. The designations were developed in cooperation with the USFS and the National Park Service. The designated OHV areas are depicted in Figure 3.9-1.

The demand for OHV use areas is, at present, not exceeding the capacity of areas open to OHV use. OHV use is not yet extremely popular within the Pinedale RMPPA. The reason for this is that most OHV users, both during the winter and non-winter seasons, use existing public access roads or the Pinedale RMPPA trails and roads as access ways to the Forest Service-managed lands. The Irish Canyon access to the Bridger National Forest is becoming an increasingly popular snowmobile use area. Most of the OHV use within the area takes place on Forest Service-managed lands within the Bridger and Teton National Forests (Hudson 2002).

Elk antler collecting, using OHVs, has become increasingly popular within the last decade. Within the Pinedale RMPPA, this activity is causing an increase in soil erosion, loss of vegetation, and degradation of visual quality due to the uncontrolled, unmanaged creation of OHV trails.

The OHV access road north of Piney Creek along the Red Dugway is becoming a safety concern because of its steep, unmaintained condition. This road, originally created for oil and gas development access, has been abandoned, but OHV users continue to use it.

3.9.3. OHV CONFLICTS

Conflicts are being to arise between various uses of the resources within the Pinedale RMPPA. The majority of conflicts are: 1) between recreationists who are seeking OHV recreation opportunities and oil and gas development that is encroaching upon and reducing the potential OHV recreation areas; and 2) OHV use that is having a negative effect on the visual resources within the area. The direct, negative OHV affect on visual resources is reducing visual quality within the area from the uncontrolled creation of roads and trails. The indirect, negative affect of OHV use on visual quality is the increase in soil erosion and the loss of vegetation caused by the creation of new trails and roads. There is further discussion of impacts on visual resources in the discussion of Recreation (Section 3.11).

Specific areas where OHV use is in conflict with other resource uses include the following (see also Figure 3.9-2):

- The Mesa Area where OHV use is in conflict with oil and gas development
- The Warren Bridge campground and areas adjacent to and north of the Upper Green River special recreation management area (SRMA) where OHV use is in conflict with both oil and gas development and established visual quality objectives
- Areas on the east side of the Wyoming Range in the vicinity of Red Canyon, Bald Mountain, and South Muddy Creek where hunting-related OHV use is creating trails on erodible soils, near riparian areas, and degrading visual quality
- The Red Dugway area, north of South Piney Creek, where a steep, two-track road, originally graded to provide access to oil and gas development areas, is being used as an OHV trail by hunters. The trail is not maintained, is poorly constructed, and is creating safety concerns, soil erosion problems, and access concerns
- The Desert area where OHV use is causing uncontrolled impacts to soils, visual resources, and vegetation

- The Blue Rim Area where OHV use conflicts with a proposed area of critical environmental concern (ACEC)
- The Potholes Area, east of the Upper Green River SRMA, where OHV use is causing degradation of visual quality along the upper reaches of the New Fork River
- Areas along the western slopes of the Wind River Range from north of Willow Lake to Irish Canyon where OHV use is affecting visual quality
- The length of Highway 189 in the vicinity of the town of Pinedale where oil and gas development, visual quality objectives, and OHV recreational use are in conflict.

3.9.4. OHV NOISE CONSIDERATIONS

OHVs can be noisy, and when OHV-produced noise becomes part of the recreational experience, noise is usually considered intrusive and unpleasant. Land uses within the Pinedale RMPPA range from wilderness study areas and sparsely populated rural areas to more densely populated small urban communities and highways. As OHV use encroaches upon other types of recreational areas within the area, noise produced by OHV use may become important to those who seek other, non-OHV recreational opportunities within the Pinedale RMPPA.

Typically, in wilderness areas, expected ambient sound levels would be approximately 30 to 40 decibels (dB). Small urban communities away from main highways and county roads typically experience outdoor sound levels that are lower than 50 dB (Cunniff 1977, Harris 1991). As defined by Federal law, a decibel meter is used to measure OHV vehicle sound at approximately 20 inches and at an angle of 45 degrees from the OHV exhaust outlet. For ATVs and motorcycles, the test is performed at 50 percent of the manufacturer's revolutions per minute (RPM) recommendation. For Class II or full-sized vehicles, the test is performed at 75 percent of an engine's maximum RPM. An approximate noise level range for the more popular brands of OHVs is between 80 and 108 dB (Oregon Off-Highway Vehicle Association [OOHVA] 2002). To establish a basis of comparison with familiar, common sound levels, the following examples are used: a bedroom at night is approximately 30 dB; a residential area at night would experience approximately 40 dB; a typical office is 50 dB; conversational speech is 60 dB; a vacuum cleaner at a distance of 6 feet is 70 dB; a concrete mixer at a distance of 50 feet is 80 dB; and a jackhammer at a distance of 50 feet is 100 dB (Bell 1973, Cunniff 1977, Harris 1991).

3.9.5. SOCIOECONOMIC CONSIDERATIONS OF OHV USE

In 2000, the Wyoming Business Council and the Wyoming State Office of Travel and Tourism published a study on the trends and the effects of tourism on the Wyoming State economy. The study showed that tax revenues generated from travelers within the State increased by 10 percent over a 3-year period (Wyoming Travel Industry 2000). OHV users that travel to the Pinedale RMPPA recreate on BLM-managed lands, but depend upon the local towns and cities for provisions, lodging, and services. It is expected that successfully maintaining and managing the OHV recreational opportunities within the Pinedale RMPPA would have long-term, positive socioeconomic effects on those towns and cities that provide tourist-related services.

3.10. PALEONTOLOGY

A paleontologic resource is a site containing non-human life of past geological periods, usually in the form of fossil remains. This section describes the paleontological resources and paleontological potential of the Pinedale RMPPA. The BLM manages paleontological resources for their scientific, education, and recreational values. The Department of the Interior has administratively determined that collection of vertebrate fossils requires a permit. Paleontological permits are issued under the authority of FLPMA, and such permits are generally issued only to qualified paleontologists.

3.10.1. PROBABLE FOSSIL YIELD CLASSIFICATION SYSTEM

The Paleontology Center of Excellence and the U. S. Forest Service Region 2 Paleo Initiative originally developed the Probable Fossil Yield Classification System (PFYC) in 1996. The classification system presented here was later modified from the 1996 model by Dale Hanson, Regional Paleontologist, BLM, Wyoming State Office.

The PFYC, although still being tested, may have particular importance as a planning tool for land managers (Hanson 2002). The system is based on the probability or potential for significant vertebrate fossil to be present in a given geologic unit. Geologic units are assigned to a Paleontology Class based on their potential to produce significant fossils. The system was not designed to designate absolute certainties or special circumstances, although these are expected and should be handled on a case-by-case basis (Hanson 2002).

3.10.1.1 Fossils of Scientific Significance

Fossils of scientific significance are those fossils with particular interest to scientists, educators, and the public, and are afforded protection under Federal Law. BLM guidelines identify significant paleontological resources by the following characteristics:

- preservation of soft body parts
- preservation of delicate or uncommon shell or skeletal parts of invertebrates
- close or intimate association of plants with animals
- preservation of the skull, whole isolated bones, or other diagnostic materials of poorly known, or unknown, vertebrates
- fossils with unique or significant geographic or stratigraphic position such as type, locality, or only known occurrence
- fossils having the potential for clarifying the evolutionary structure, development and behavior of the organism and/or its environment.

Due to their rarity, vertebrate fossils are always considered to be scientifically significant in management areas; however, other kinds of fossils, such as invertebrates and plants, may be "considered significant by land managers, in consultation with paleontologists and other expertise" (BLM 1996).

3.10.1.2. Paleontology Classes with Management Recommendations

Paleontology Classes that indicate how likely a geologic unit is to produce significant fossils have been assigned to every formation or geologic unit in the Pinedale Field Office area. Paleontology Classes range from Class 1 (lowest potential) to Class 5 (highest potential). A description of each Paleontology Class as described by Hanson (2002) follows.

3.10.1.2.1. Class 1

Rock units placed in Class 1 include igneous and metamorphic units (excluding tuffs), or units in heavily disturbed preservational environments that have been determined unlikely to contain fossil remains. The basis for assigning a Class 1 fossil potential to a geologic unit includes: 1) no fossils of any kind are known to occur within the unit; 2) the geologic unit has an igneous or metamorphic origin; or 3) the unit is composed of landslide or glacial deposits.

3.10.1.2.2. Class 2

Rock units placed in Class 2 include sedimentary units that are not likely to contain vertebrate fossils or scientifically significant nonvertebrate fossils. The basis for assigning a Class 2 fossil potential to a rock unit includes: 1) vertebrate fossils occur very rarely within the unit or not at all; 2) the rock unit has been assigned an age greater than the Devonian (first occurrence of vertebrates); 3) the unit has been assigned an age younger than 10,000 years before present; 4) the unit was formed in a deep marine environment; 5) the rock unit has an aeolian origin; or 6) the unit has undergone diagenetic (post-depositional) alteration.

3.10.1.2.3. Class 3

Rock units assigned to Class 3 include fossiliferous sedimentary units that produce fossils of varying significance, abundance, and predictable occurrence. A Class 3 probability level is also assigned to sedimentary units with unknown fossil potential. The basis for assigning a Class 3 fossil potential to a geologic unit includes: 1) geologic units with sporadic known occurrences of vertebrate fossils; 2) vertebrate fossils and significant nonvertebrate fossils are known to occur inconsistently within the unit, therefore, predictability is known to be low; or 3) the geologic unit is poorly studied and /or poorly documented, and the local potential fossil yield cannot be assigned without ground reconnaissance.

3.10.1.2.4. Class 4

Rock units assigned to Class 4 are Class 5 units (discussed below) have been determined to have a higher risk of human-caused adverse impacts and/or a higher risk of natural degradation. The basis for assigning a Class 4 fossil potential to a geologic unit includes: 1) the geologic unit is covered with a significant soil and/or vegetative cover, therefore, the outcrop is not likely to be impacted; 2) areas of any exposed outcrop are smaller than 2 contiguous acres; 3) outcrops form cliffs of sufficient height and slope that are out of reach by normal means; or 4) other characteristics that lower the vulnerability of both known and unidentified fossil sites.

3:10.1.2.5. Class 5

Rock units assigned to Class 5 include formations that have been identified as highly fossiliferous geologic units that regularly and predictably produce vertebrate fossils and/or scientifically significant nonvertebrate fossils, and that are at risk of natural degradation and/or human-caused adverse impacts. The basis for assigning a Class 5 fossil potential to a geologic unit includes: 1) vertebrate fossils and/or scientifically significant nonvertebrate fossils are known and documented to occur consistently, predictably, and/or abundantly; 2) the geologic unit is exposed with little or no vegetative or soil cover; 3) outcrop areas are extensive and discontinuous areas are larger than 2 contiguous acres; 3) the outcrop erodes readily, may form badlands; 4) there is easy access to extensive outcrops in remote areas; or 5) other characteristics that increase the sensitivity of both known and unidentified fossil sites.

3.10.2. PALEONTOLOGICAL RESOURCES PRESENT BY GEOLOGIC UNIT

Rock units representing over 2.6 billion years of geologic time are present in the Pinedale RMPPA. The geologic units containing paleontological resources span from 544 million years old to 10,000 years old. A description of the paleontological resources contained within each geologic unit, and the unit's associated Paleontology Class, is presented below.

3.10.2.1. Precambrian Era (4.6 billion to 544 Million Years Ago)

The Precambrian geologic units present in the Pinedale RMPPA include 2.6 billion-year-old granitic basement rocks, granodiorite from the Louis Lake Pluton and granite gneiss. All three Precambrian units have been assigned a Class 1 paleontology potential (Hanson 2002). Due to their age and lithology type, the Precambrian rocks located within the area contain no paleontological resources.

3.10.2.2. Paleozoic Era (544 to 245 Million Years Ago)

The Paleozoic Era is divided into seven periods: Cambrian, Ordovician, Silurian, Devonian, Mississippian, Pennsylvanian, and Permian.

3.10.2.2.1. Cambrian Period (544 to 505 Million Years Ago)

The Cambrian Formations present in the Pinedale RMPPA include the Flathead Sandstone, the Gros Ventre Formation, and the Gallatin Limestone (Love et al. 1993).

Flathead Sandstone

The Middle Cambrian Flathead Sandstone outcrops present in the area have been assigned a Class 2 paleontology potential. Fossil vertebrates and significant nonvertebrate fossils have not been reported from this formation (Daitch and Robinson 2002). Brachiopods are known to occur in several Flathead localities throughout Wyoming; however, they have not been determined to be significant.

Gros Ventre Formation

The Middle to Upper Cambrian Gros Ventre Formation has been assigned a Class 2 paleontology potential. Fossil vertebrates and significant nonvertebrate fossils are not known to occur in Gros Ventre sediments (Daitch and Robinson 2002). Reported nonsignificant invertebrate fossils include trilobites (*Alokistocare*, *Bolaspis*) and mollusks (*Hyolithes*).

Gallatin Limestone

The Upper Cambrian Gallatin Limestone has been assigned a Class 2 paleontology potential in the area. No significant nonvertebrate or vertebrate fossils are known to occur within the formation (Daitch and Robinson 2002).

3.10.2.2.2. Ordovician Period (505 to 440 Million Years Ago)

The Upper Ordovician Bighorn Dolomit has been assigned a Class 2 paleontology potential. Several invertebrate groups, such as mollusks and corals, as well as nonvertebrate chordates (conodonts and graptolites), are reported from the unit.

Significant fossil vertebrates are rare. The only know occurrences of fossil vertebrates within the Bighorn Dolomite are from the upper part of the Bighorn Dolomite in the Bighorn Mountains in northeastern Wyoming (Daitch and Robinson 2002).

3.10.2.2.3. Silurian Period (440 to 410 Million Years Ago)

There are no rocks or paleontological resources of Silurian age in the Pinedale RMPPA.

3.10.2.2.4. Devonian Period (410 to 360 Million Years Ago)

The Upper Devonian Darby Formation has been assigned a Class 3 paleontology potential throughout Wyoming. Recorded fossils include several invertebrate groups and conodonts (Daitch and Robinson 2002). No fossil vertebrates have been reported; however, based on age and sediment type, it is possible for as yet unidentified vertebrate fossils to occur within the unit.

3.10.2.2.5. Mississippian Period (360 to 325 Million Years Ago)

The Mississippian Madison Limestone has been assigned a Class 3 paleontology potential in the area. The unit has produced abundant invertebrates including mollusks, crinoids, brachiopods, and corals; however, no significant vertebrate fossils have been reported (Daitch and Robinson 2002). Due to its age and sediment type, there is the possibility that unidentified fossil vertebrates are present in Madison Limestone sediments.

3.10.2.2.6. Pennsylvanian Period (325 to 286 Million Years Ago)

There are two Pennsylvanian-age formations mapped within the Pinedale RMPPA, the Lower Pennsylvanian Amsden Formation, and the Pennsylvanian Tensleep Formation.

Amsden Formation

The Lower Pennsylvanian Amsden Formation, partially correlative to the Wells Formation in the area, has been assigned a Class 3 paleontology potential. The Amsden

Formation is well known for its diverse invertebrate fauna, and rare fossil fish remains have been reported in Wyoming as well (Daitch and Robinson 2002).

Tensleep Sandstone

The Pennsylvanian Tensleep Sandstone, partially correlative to the Wells Formation in the area, has been assigned a Class 3 paleontology potential. Recorded fossils include several invertebrate groups, although no significant fossil vertebrates have been reported (Daitch and Robinson 2002). However, based on its age and sediment type, it is possible for unidentified vertebrate fossils to occur within the unit.

3.10.2.2.7. Permian Period (286 to 245 Million Years Ago)

The Permian Phosphoria Formation has been assigned a Class 3 paleontology recommendation throughout Wyoming. The unit is known for its extensive invertebrate fauna, and fish remains, although fairly rare, have been reported (Daitch and Robinson 2002). Fossil shark teeth from the genus *Heliocoprion* have been collected from Phosphoria sediments. The teeth are often sold on the commercial market, where they are prized for their unusual spiral arrangement and display value (Daitch and Robinson 2002).

3.10.2.3. Mesozoic Era (245 to 65 Million Years Ago)

The Mesozoic Era is often referred to as the "age of dinosaurs." The Mesozoic is divided into three periods: Triassic, Jurassic, and Cretaceous.

3.10.2.3.1. Triassic Period (245 to 208 Million Years Ago)

Five Triassic-age formations are mapped within the area: the Dinwoody Formation, the Woodside Shale, the Thaynes Limestone, the Ankareh Formation, and the Nugget Sandstone.

Dinwoody Formation

The Lower Triassic Dinwoody Formation has been assigned a Class 3 paleontology potential throughout Wyoming. Reported fossils include invertebrates and conodonts (Daitch and Robinson 2002). No vertebrate fossils have been recorded; however, due to the formation's age and lithology, unidentified vertebrate fossils may be present within the unit.

Woodside Shale

The Lower Triassic Woodside Shale (or Formation) as been assigned a Class 3 paleontology potential. No fossils have been recovered from this unit; nevertheless, sediment type and age indicate that significant fossils may be present in some areas (Daitch and Robinson 2002).

Thaynes Limestone

The Lower Triassic Thaynes Limestone in the area has been assigned a Class 3 paleontology recommendation. Recorded fossils include invertebrates and trace fossils. The lower-most limestone contains a prolific ammonoid-bearing bed, containing *Meekoceras*. No vertebrate fossils have been reported from the Thaynes Limestone; nevertheless, sediment type and age indicate that significant fossils may be present in some areas (Daitch and Robinson 2002).

Ankareh Formation

The Triassic Ankareh Formation has been assigned to Paleontology Class 3. Fossils reported from Ankareh sediments include various invertebrate groups, plant remains, and root casts. Significant vertebrate fossils are limited to lungfish tooth plates (Daitch and Robinson 2002).

Nugget Sandstone

The Nugget Sandstone is of uncertain age (Upper Triassic or Lower Jurassic). The unit has been assigned to Paleontology Class 3 in Wyoming. No vertebrate bones have been reported, although vertebrate tracks are well known (Daitch and Robinson 2002).

3.10.2.3.2. Jurassic Period (208 to 146 Million Years Ago)

There are six Jurassic-age formations mapped in the area: the Gypsum Springs Formation, the Twin Creek Limestone, the Preuss Formation, the Stump Sandstone, and the Morrison and Cloverly Formations. All six units have the potential to produce significant fossils in the area.

Gypsum Springs Formation

The Jurassic Gypsum Springs Formation has been assigned to Paleontology Class 3. The unit is, in general, poorly fossiliferous, although reports of *Pholadomya*, *Trigonia*, and *Astarte* are known (Wanless et al. 1955).

Twin Creek Limestone (Sundance Formation)

The Middle to Upper Jurassic Twin Creek Limestone, sometimes correlated to the lower part of the Jurassic Sundance Formation, has been assigned a Class 3 paleontology recommendation. Fossils have been reported in Twin Creek units; however, only invertebrate faunas, including *Grypaea* and *Penticrinus*, have been found to date (Daitch and Robinson 2002).

Preuss Formation

The Middle to Upper Preuss Formation has been assigned to Paleontology Class 3. No significant vertebrate fossils have been recorded, although unidentified significant paleontological resources may be present.

Stump Sandstone

The Middle to Upper Stump Sandstone (or Formation) has a Class 3 paleontology recommendation. Rare fossil vertebrates have been reported in Stump sediments, and both invertebrate and trace fossils have been reported in abundance (Daitch and Robinson 2002).

Morrison Formation and Cloverly Formation

The Upper Jurassic Morrison and Lower Cretaceous Cloverly Formations have been mapped together in the Pinedale RMPPA. Both units have produced highly significant vertebrate fossils in the past, and have been assigned a Class 5 paleontology recommendation. The Morrison Formation is well known for producing significant and highly diverse fauna and flora that includes mollusks, fish, trace fossils, as well as various dinosaurs, such as *Camptosaurus*, *Allosaurus*, *Brachiosaurus*, *Apatosaurus,* and *Stegosaurus* (Jenkins and Jenkins 1993, Turner and Peterson 2002). The Cretaceous Cloverly Formation has produced a diverse dinosaur fauna, as well as other Mesozoic reptiles and early Cretaceous mammals (Daitch and Robinson 2002).

3.10.2.3.3. Cretaceous Period (146 to 65 Million Years Ago)

There are ten geologic units of Cretaceous age in the area, including the Gannett Group, the Bear River Formation, the Mowry Shale, the Thermopolis Shale, the Aspen Shale, the Frontier Formation, the Hilliard Shale, the Cody Shale, the Adaville Formation, and the Pinyon Conglomerate. All ten formations have a moderate to high potential to produce significant vertebrate fossils in the Pinedale area.

Gannett Group

The Lower Cretaceous (or possibly upper Jurassic) Gannett Group has been assigned to Paleontology Class 3. Fossils appear to be rare and discoveries have thus far been limited to invertebrates and pollen.

Bear River Formation and Mowry Shale

The Bear River Formation, located in the southern portion of the area, and the Cretaceous Mowry Shale, located in the northern portion of the area, are considered synonymous. Both units have been assigned a Class 3 paleontology recommendation. Fossils reported from the Mowry Shale include various invertebrate groups, fish (including the oldest known acanthomorph teleost), ichthyosaurs, plesiosaurs, and crocodilians. Fossils assigned to the Bear River Formation include both fresh and brackish water invertebrates, as well as plant remains.

Thermopolis Shale and Aspen Shale

The Thermopolis Shale, recognized in the northern portion of the area, and the Aspen Shale, recognized in the southern portion of the area, have been determined to be synonymous geologic units. Both the Thermopolis and Aspen Shales have a Class 3 paleontology potential. The only reported fossils within both units are invertebrates; no fossil vertebrates have been recorded.

Frontier Formation

The Upper Cretaceous Frontier Formation has been assigned to Paleontology Class 3. The Frontier Formation contains rare fish, and numerous plant and invertebrate fossils; it is known for its abundant ammonite fauna (e.g., Knowlton 1917; Ware 1927; Andrews and Pearsall 1941; Cobban 1987a, 1987b, 1988, 1990).

Hilliard Shale and Cody Shale

The lower Upper Cretaceous Hilliard Shale (found in the southern part of the area) and the correlative Cody Shale (found in the northern part of the area) have been assigned to Paleontology Class 3. To date, foraminiferal (microfossil) studies comprise the bulk of the paleontologic investigation in the Hilliard Shale.

Adaville Formation

The Upper Cretaceous Adaville Formation has been assigned to Paleontology Class 3. It contains invertebrate and plant remains, but no vertebrates have thus far been reported (e.g., Rubey et al. 1975).

Pinyon Conglomerate

The Upper Cretaceous/Lower Tertiary Pinyon Conglomerate has been assigned to Paleontology Class 3; however, it is considered correlative (e.g., Love 1980) to portions of the Fort Union Formation (Paleontological Class 5) and the Evanston Formation (Paleontological Class 4). The correlative formations contain abundant and important vertebrate remains (fish, lizard, and mammal fossils), in addition to invertebrate and plant remains.

3.10.2.4. Cenozoic Era (65 Million Years Ago to Present Day)

The Cenozoic Era, also known as the "age of mammals," spans from 65 million years ago to the present day. The Cenozoic is broken into two periods of geologic time, the Tertiary and the Quaternary. Due to a more complete fossil record, the Tertiary Period can be broken down further into five epochs: Paleocene, Eocene, Oligocene, Miocene, and Pliocene. The Quaternary Period is broken into two epochs: the Pleistocene and Holocene (or Recent; our current period of geologic time). A discussion of the paleontological resources of Cenozoic age contained within the area is presented below.

3.10.2.4.1. Tertiary Period (65 to 1.8 Million Years Ago)

The Tertiary Period is broken into five epochs, the Paleocene, Eocene, Oligocene, Miocene, and Pliocene. Highly significant paleontological resources of Tertiary age are found in the Pinedale RMPPA.

Paleocene Epoch (65 to 54 Million Years Ago)

There are no rocks or paleontological resources assigned to formation status of Paleocene age in the area, although the Pinyon Conglomerate (see above) may be in part Paleocene in age, and the Chappo Member of the Wasatch Formation may contain a mammalian fauna of mid- to late Paleocene age.

Eocene Epoch (54 to 38 Million Years Ago)

Strata of Eocene age in the Pinedale RMPPA consist of the Wasatch, Green River, and Pass Peak Formation (Bradley 1964). These formations were deposited somewhat contemporaneously and contain rich vertebrate remains; thus, they have similarly high Paleontological Class designations (4 or 5).

Pass Peak Formation

The Lower Eocene Pass Peak Formation has been assigned to Paleontology Class 3 or 4. It contains a diverse vertebrae fauna typical of the upper Wasatchian land mammal stage (early Eocene), as well as a molluscan fauna (Dorr 1969).

Wasatch Formation

The Wasatch Formation has been assigned to Paleontology Class 5. Much of the formation is considered Lower Eocene, although a mid- to late Tiffian (mid- to late Paleocene) mammalian fauna is known from the Chappo Member (Gunnell 1994) and a middle Eocene mammalian fauna has been reported from the Cathedral Bluffs Tongue (West and Dawson 1973). The Wasatch Formation contains a well preserved but fragmentary record of vertebrate fossils, including fish, reptiles, birds, and mammals, as well as invertebrate and plant fossils. A large body of literature has been published on the Wasatch Formation (e.g., McKenna 1960, West 1973, West and Dawson 1973, Dorr 1978, Gingerich and Dorr 1979, Gautier 1982, Roehler et al. 1988, Gunnell 1994).

Green River Formation

The Green River Formation is early to middle Eocene in age and has been assigned to Paleontology Class 5. As a consequence of the superb vertebrate fossil preservation and diversity present in the Green River Formation, it represents one of the most important Eocene deposits in the world. It is particularly famous for excellently preserved fish fossils; well preserved turtle, ray, snake, alligator, bird, insect, and plant fossils are also known from the Green River Formation in addition to the famous fish fossils. Grand (1980) reviewed important fish and other vertebrate fossil discoveries.

3.10.2.4.2. Oligocene-Miocene-Pliocene Epoch (38 to 2.8 Million Years Ago)

There are no rocks or paleontological resources of Oligocene, Miocene, or Pliocene age in the area.

3.10.2.4.3. Quaternary Period (1.8 Million to Present Day)

The Quaternary is broken into two epochs: the Pleistocene (the time of the “ice ages”), and the Holocene.

The Quaternary deposits consist of alluvium-colluvium assigned to Paleontology Class 3, dune and loess deposits assigned to Paleontology Class 1, gravel-pediment-fan deposit assigned to Paleontology Class 3, landslide deposits assigned to Paleontology Class 1 and glacial deposits assigned to Paleontology Class 1. No significant vertebrate fossils have been recorded from the Class 3 alluvium and colluvium and grave-pediment-fan deposits, although unidentified significant paleontological resources may be present.

3.11. RECREATION RESOURCES

With a major river system (the Upper Green River) and several major mountain ranges, the Pinedale RMPPA is a popular recreation area, both nationally and locally. Outdoor recreational activity is steadily increasing, both in the types of activities and in the intensity of use. This increase in recreational use is presenting challenges to managing outdoor recreation in order to accommodate the demands on recreational resources and, at the same time, to preserve those resources.

3.11.1. RESOURCE SETTING AND DESCRIPTION

The Pinedale RMPPA is located in western Wyoming, near the Yellowstone and Grand Teton National Parks. The area lies within the Upper Green River watershed, and is bounded on the north and west by the Teton and Bridger National Forests, and on the east by the Bridger National Forest and Bridger Wilderness Area. Lying within two distinct physiographic provinces, the Wyoming Basin province and the Central Rockies province, the Pinedale RMPPA possesses a diversity of landforms and topographical features capable of supporting many types of recreational opportunities.

Specific recreational resources in the RMP area include Special Management Recreation Areas (discussed in Section 3.20), and developed recreation sites (see Figure 3.11-1). There are three developed recreation sites within the Pinedale RMPPA:

- Warren Bridge Campground - This campground is located approximately 25 miles north of Pinedale, at a point where U.S. Highway 191 crosses the Green River. The site consists of developed campsites, picnicking areas, and waste facilities. The site uses a self-pay fee system and is maintained by BLM-contracted local residents
- New Fork Campground - This recreational area consists of undesignated camping and picnic sites and waste facilities. The campground is located on Wyoming State Highway 351 where the highway crosses the New Fork River. It is maintained by BLM-contracted local residents during the heavy-use season, summer through fall
- Stokes Crossing Campground - Stokes Crossing campground is located 2 miles southwest of Boulder Lake along Boulder Creek. Recreational development at this site consists of several undesignated camping sites, picnicking areas, and waste

facilities. As with the other developed campgrounds, this site is maintained by BLM-contracted local residents (BLM 1986).

3.11.2. RECREATION USE TRENDS

Population growth in the western and southwestern United States and recent population shifts to these regions have produced an increasing demand for recreational areas on publicly-managed lands. Public lands managed by the BLM have become important destinations for those seeking outdoor recreational opportunities, given the diversity of resources found on public lands and the availability of these lands for recreational use. The BLM General Recreational Policy Statement supports the BLM's goal of multiple use and sustained yield of BLM-managed public lands (BLM 1990). As recreational demand grows, along with economic pressures to develop these public lands, potential conflicts may arise among recreational activities, and between recreational activities and economic development of these public lands.

The heaviest use of the developed areas occurs during the summer months, between July and September. Winter use is the fastest growing use season. Recreational use in the planning area was estimated using Recreational Visitor Days (RVDs) as a unit of measure. An RVD is defined as a 12-hour period. RVDs for the planning area were estimated using data from BLM's Recreational Management Information System (RMIS). The BLM tracks recreational use for several areas within Wyoming including the Pinedale Field Office. Table 3.11-1 shows the RVDs per activity for the Pinedale Field Office for a three-year period 1998- 2001. During this time, over 300,000 RVDs occurred within the Pinedale Field Office for a variety of activities. The most popular of these activities were float or raft trips, fishing, climbing – mountain/rock and hiking/walking/running. Specific recreational use trends of note are presented in the following sections.

3.11.2.1. River Recreation

In the Pinedale RMPPA, river recreation is experiencing a substantial increase in recreational and access demands. The Upper Green River SRMA is the destination for most of the recreational opportunities provided by river recreation, which includes scenic river floating, river float fishing, and shoreline fly-fishing. Fly-fishing is still the primary recreational activity associated with the river, however, river floating is becoming increasingly popular. Increasing demand for river recreation is creating associated demands for river recreation facilities. These use demands include improved access and takeout points along the river for river floaters, improved restrooms, improved vehicle parking areas, and camping sites (Hudson 2002).

As the demand for river recreational opportunities increases, conflicts between various users of the resource are beginning to arise. In the Upper Green River SRMA, recreational use conflicts due to overcrowding are increasing between fishermen and river floaters. The resource is approaching its capacity to provide the expected river experience. Conflicts are also arising between river floaters and owners of private lands along which the river flows. The sources of this conflict are related to river floaters trespassing on private property, and to river floaters trampling on private property and/or fouling the riparian areas with waste (Hudson 2002).

The continued leasing of land for oil and gas exploration and extraction adjacent to areas of high recreational value is creating the potential for conflict between those seeking recreational opportunities and the oil and gas industry. An area particularly sensitive to oil and gas development is the Upper Green River SRMA, where continued land leasing for oil and gas exploration may degrade the recreational resource and the recreational opportunities provided in the area.

3.11.2.2. Camping

The demands for camping opportunities within the Pinedale RMPPA appear to be stable. Warren Bridge campground is heavily used, as are the camping facilities within the Scab Creek SRMA. Scab Creek appears to be approaching capacity, and resource use conflicts are beginning to arise among those seeking different recreational opportunities, mostly between campers and fishermen. The cause of the conflict is overcrowding and lack of adequate space and solitude to provide the expected recreational experience (Hudson 2002).

3.11.2.3. Hunting/Wildlife Viewing

Hunting and wildlife viewing are widespread throughout the Pinedale RMPPA. Historically, the demand for hunting within the Pinedale RMPPA has exceeded the supply, and this trend continues. Hunting is not included in Table 3.11-1. Given the migratory nature of game herds, it is difficult to estimate the total hunting days occurring within any specific planning area. The best source of hunting data is from the Wyoming Game and Fish Department, which monitors hunting data within hunt areas that are fully or partially included in specific BLM planning areas. Hunting data is presented in Section 3.19.

3.11.2.4. Elk Antler Collecting

Elk antler collecting is a relatively new recreational activity, related to OHV use. This activity is becoming increasingly popular. OHV use is discussed in Section 3.9.

3.11.3 THE RECREATION OPPORTUNITY SPECTRUM

The Recreation Opportunity Spectrum (ROS) is a method widely used by the BLM for determining the level of development within a recreation area, and provides the BLM with a framework for determining the existing outdoor recreational opportunities and management potential. The classification of recreational opportunities range from primitive to developed types of recreation, based on a combination of activity, setting, and experience opportunities. The BLM uses this classification as a management tool. The goals of the ROS system are to: 1) establish outdoor recreation management goals and objectives for specific areas; 2) allow for modification of recreational opportunities when other resource management actions are proposed; and 3) establish standards for an area that would allow monitoring of the recreational experience and opportunities. The current ROS management system for the Pinedale RMPPA is depicted in Figure 3.11-2. The ROS classifications include the following:

- Primitive - characterized by a roadless, essentially unmodified natural environment. Activities might include camping, hiking, enjoying scenery or natural features, photography, hunting, swimming, diving, fishing, canoeing, sailing, and river running (non-motorized craft)
- Semi-Primitive - characterized by a roadless, predominantly unmodified natural environment. Activities might include camping, hiking, enjoying scenery or natural

features, photography, hunting, swimming, fishing, canoeing, sailing, and river running (non-motorized craft)

- Semi-Primitive (Motorized) - same as semi-primitive, except that motorized use is permitted
- Roaded (Natural) - characterized by a generally natural environment, with evidence of resource modification and utilization harmonizing with the natural environment. Motorized travel is permitted
- Rural - characterized by a substantially modified natural environment. Activities might include: camping, hiking, enjoying scenery or natural features, photography, swimming, fishing, canoeing, sailing, river running (motorized craft), power boating, picnicking, rock collecting, wood gathering, auto touring, water skiing and other water sports, interpretive services use, rustic resorts and organized camps, competitive games, spectator sports, bicycling, jogging, outdoor concerts, and modern resorts.

3.11.4. RECREATIONAL VISUAL RESOURCE CONSIDERATIONS

Visual resources (Section 3.16) are relevant to recreational activities in several ways. Sightseeing is a recreational activity that depends on the quality of visual resources. Some recreation activities are enhanced by a high degree of visual quality, such as river floating and hiking. Also, some recreational activities, such as OHV use, have an impact on visual resources.

3.11.5. RECREATIONAL NOISE CONSIDERATIONS

When it becomes part of the recreational experience, noise (unwanted sound) is usually considered to be intrusive and unpleasant. In fact, recreation and noise are generally incompatible, as most people who seek recreational opportunities usually seek out those areas that are not noisy. Land uses within the Pinedale RMPPA range from wilderness and sparsely populated rural areas to more densely populated small urban communities and highways. As oil and gas development and OHV use encroaches upon potential recreational areas within the Pinedale RMPPA, noise from the construction, operation, and maintenance of oil and gas facilities, and OHV use, may become a nuisance to those seeking recreational opportunities with more solitude within the Pinedale RMPPA.

In wilderness areas, expected ambient sound levels would be approximately 30 to 40 decibel (dB). Small urban communities away from main highways and county roads typically experience outdoor sound levels that are lower than 50 dB (Cunniff 1977;

Harris 1991). A typical pipeline pumping station will produce approximately 85 dB of noise (Williams 1999). To establish a basis of familiarity for sound levels, the following examples are used: a bedroom at night is 30 dB; a residential area at night is 40 dB; a typical office is 50 dB; conversational speech is 60 dB; a vacuum cleaner at a distance of 6 feet is 70 dB; a concrete mixer at a distance of 50 feet is 80 dB; and a jackhammer at a distance of 50 feet is 100 dB (Bell 1973, Cunniff 1977, Harris 1991).

3.12. SOCIOECONOMICS

The Pinedale RMPPA is located in western Wyoming in portions of Lincoln and Sublette counties. Activities in the Pinedale RMPPA have the potential to affect not only these two counties but also the adjacent counties of Fremont and Sweetwater. This is due to the fact that important economic centers are located in these two adjacent counties that provide services to individuals and businesses in Fremont and Sublette Counties. Therefore the socioeconomic study area includes Lincoln and Sublette Counties (within the Pinedale RMPPA), and Fremont and Sweetwater Counties (outside the Pinedale RMPPA), as shown in Figure 3.12-1.

3.12.1. COUNTY CHARACTERISTICS

Like much of Wyoming, the economic study area is quite rural in nature. All four counties have a rather large land area with a dispersed population as summarized in Table 3.12-1. The number of persons per square mile ranges from 1.2 in Sublette County to 3.6 in Lincoln and Sweetwater Counties, which are below the State and national average.

The largest population centers in the study area are listed in Table 3.12-2. Many of the largest towns are reporting declines in population, while smaller communities such as Afton and Pinedale are showing increases in population.

Public lands dominate this area with 67 percent of total land area being owned and managed by Federal agencies including the BLM. The Pinedale RMPPA comprises approximately 931,000 surface acres, which accounts for 16 percent of the Lincoln and Sublette Counties where these lands area located.

3.12.2. DEMOGRAPHIC CHARACTERISTICS

3.12.2.1. Sources of Population Change

Annual population estimates for each county in the study area for 1980-2000 show a population decline of 3.6 percent over the twenty years, equating to an annual average decline of less than one percent per year. The majority of the population decline occurred in the larger two counties (Fremont and Sweetwater) with Lincoln and Sublette Counties reporting slight increases in population during this time.

Increases in population are due to natural changes (more births than deaths), while net migration is continuing to draw individuals away from the area. Overall, the socioeconomic study area followed a statewide trend of declining population due to net migration. Available data indicate that more individuals continue to leave than are moving into the area in spite of the increases in total population during the last two decades.

The socioeconomic study area mirrors the rest of the State with a very small population of minority groups with the exception of American Indian. For these four counties, 8 percent of the population indicated they were of American Indian decent, which is higher than the State average of 2.3 percent. This is due to the location of the Wind River Reservation in Fremont County. The percentage of ethnic groups other than "white" or "American Indian" in the study area is quite small, which is common throughout Wyoming.

3.12.2.2. Personal Income Trends

Personal income data was obtained for each county in the study area from the U.S. Bureau of Economic Analysis. Total personal income increased to over $2.3 billion in 1999 up from $1.9 million in 1979. During this twenty-year period, personal income grew by nearly 19 percent with all of this growth occurring during the 1990s.

Personal income can be broken down into three categories: labor income, investment income and transfer payments. Labor income is derived through wages, salaries and self-employment income. Investment income includes income in the form of rents, dividends and interest earnings. Finally transfer payments are largely derived from Social Security benefits, Medicare and Medicaid benefits, and other income support and assistance.

The study area is showing signs of shifting patterns of income growth. For instance, labor income now accounts for 63 percent of total personal income, down from 80 percent in 1979. Income from non-labor sources has grown from 20 percent in 1979 to 37 percent in 1999. This change in how individuals earn income is not unlike national or State trends.

The socioeconomic study area has started to lag behind State and national trends associated with per capita income. By 1999, per capita income for the study area was $24,390, which was below the national ($27,358) and State ($27,528) averages. This is a deviation from 1979 when per capita income in the study area was very comparable to State and national averages.

3.12.3. ECONOMIC CHARACTERISTICS

This section focuses on trends associated with certain economic characteristics in the socioeconomic study area. This includes changes in the labor force and unemployment and trends in employment and earnings by industry.

3.12.3.1. Labor Force and Unemployment

Change in the labor force and unemployment can provide information on the health of the local economy. As a whole, unemployment in the much of the socioeconomic study area has been higher than unemployment for the State of Wyoming during the 1990s. The exception is Sublette County, which reported unemployment rates well below the State and national averages. Unemployment rates in the other three counties have consistently been higher than the State and national averages since 1995.

Changes in the civilian labor force during the 1990's are summarized for each county and Wyoming in Table 3.12-3. The civilian labor force is defined as all persons over 16-years of age in the civilian non-institutional population who either had a job or were looking for a job in the last 12 months. Overall, the study area realized slower growth in the civilian labor force than for the State.

3.12.3.2. Employment and Earnings by Industry

The U.S. Bureau of Economic Analysis (BEA) estimates annual employment and earnings for counties throughout the U.S. Total annual employment includes both full-time and part-time jobs so individuals with more than one job are counted twice. The employment estimates include those that are employed by businesses and public entities as well as individuals that are self-employed. Data was obtained from BEA regarding total annual employment for each county, Wyoming and the U.S. for 1979, 1989 and 1999 in order to examine trends in employment by industry over this twenty-year period.

Total employment in the study area increased by 12 percent over the twenty-year period from 51,129 in 1979 to 57,183 in 1999. Compared with employment growth in Wyoming and nationwide, this area lagged behind in employment growth. For instance, over the same twenty-year period total employment grew by 19 percent in Wyoming and 36.4 percent nationwide.

Employment by industry for 1999 is summarized in Figure 3.12-2. Services, government, and retail trade comprise the largest percentage of total employment for this area. These three industries accounted for over 60 percent of total employment in 1999. In addition, these three industries experienced the greatest growth in employment accounting for 10,000 additional jobs over the twenty-year study period. Industries showing the greatest decline in employment between 1979 and 1999 were mining, construction and farming.

Counties in the socioeconomic study area are typical of many rural areas throughout the West and rely more heavily on traditional natural resource based industries such as mining and agriculture. For instance, in 1999, mining jobs, including oil and gas operations, accounted for 9 percent of total employment in the study area and 5.5 percent throughout the State. In addition, this area is slightly more dependent on farm employment then the rest of the State. In 1999, farm employment accounted for 4.2

percent of total employment in the socioeconomic study area and 3.8 percent throughout Wyoming.

Figure 3.12-3 provides a summary of gross earnings by industry for the socioeconomic study area in 1999. The mining sector provided the largest percentage of earnings of any industry in this area in 1999, accounting for 22 percent of the total earnings. This category includes metal, nonmetallic and coal mining and oil and gas operations. While mining remains important in terms of earnings for this area, the industry has reported a 44 percent decline in earnings between 1979 and 1999. Other industries reporting declines in earnings between 1979 and 1999 include wholesale and retail trade, construction and farms. Additional industries important to this area in terms of earnings include government and services.

3.12.3.3. Economic Base Analysis

An area's economic base is composed of industries that are primarily responsible for bringing outside income into the local economy. Certain sectors within the economy are thought to be "basic" in nature in that most of their sales are tied to outside markets or customers. These industries include manufacturing, mining, and agriculture. In addition, certain government sectors, mainly Federal and state governments, are considered basic in nature because employees are paid from sources outside the local area.

Outside sources of income can also be derived from non-labor sources (investment income and transfer payments). For instance transfer payment income, can become an "economic driver" for the area's economy. This is because many transfer payment programs are sustained by sources outside the local area. Therefore, income of this type is received, spent and re-spent in the area, which generates additional income for the local economy. This is also true for investment income though it is not known for certain what percentage of investment income is generated from outside sources. Therefore, an assumption was made here that 30 percent of investment income is generated from outside sources.

Using these definitions of basic industries and outside sources of income, an analysis was conducted on the components of the economic base of the economy in the study area. Table 3.12-4 provides a breakdown of the components of the area's economic base and outside sources of income for the counties in the socioeconomic study area for 1979, 1989 and 1999. Columns 6 through 8 show the percentage of income earned from outside sources decreased from 64 percent in 1979 to 53 percent 1999. In addition, there appears to be a shift in the sources of this outside income during the study period. Non-labor sources of income now account for the largest percentage of personal income. This is a significant shift since 1979 when mining provided one-third of total personal income for this area. By 1999, mining accounted 15 percent of total personal income. Other traditional basic industries such as agriculture and manufacturing have consistently provided a very small percentage of outside income for this area.

Examination of these data indicates that the economy in the study area is now more dependent on non-labor sources (transfer payments and investment income) of income than traditional basic industries for outside sources of income. These two sources now account for 20 percent of total personal income. While the economy is less dependent on one dominant industry (mining), as is common in rural western areas, other basic industries are not growing in importance to accommodate the loss in mining earnings.

However, these data do not shed light on how the economy may be diversifying into other industries that are capable of bringing in outside income to the local economy. For instance, other industries such as real estate, and some service sectors will bring in outside income into the economy. It is likely that certain service sectors and the fire, insurance, real estate (FIRE) sector have brought in additional outside income to this area due the nature of their business and modest growth during the study period.

Recreational activity has important economic value both in terms of the satisfaction it provides local residents and the economic activity in generates for the regional economy. In terms of economic activity, recreation generates additional spending in the local economy that supports jobs and income. Economic stimulus occurs as non-residents to the area spend money in the local economy that generates additional spending by local residents. This assumes that if local residents were not participating in recreation they probably would have spent their money on something else in the region's economy. Thus, expenditures by local residents are seen as a shifting of dollars from one sector to another within the local economy and not a net gain to the region. Outdoor recreation in general is important to the region both in terms of satisfaction to residents and economic stimulus for the regional economy.

3.12.4. PROPERTY VALUATION AND TAXATION

Property valuation includes property assessed by the State of Wyoming and locally assessed property. The State of Wyoming assesses taxes on both mineral and non-mineral property. Non-mineral property assessed by the State includes airlines, utilities, pipelines and gas distribution systems, railroads, and phone service. During fiscal year 2001, the valuation of property assessed by the State was $2.6 billion for the study area. Local government also assesses four categories of property including agricultural land, residential and commercial land, improvements and personal property and industrial property. During fiscal year 2001, the value of property assessed by local governments in the study area exceeded $738 million. Total value of assessed property in the four county study area was $3.4 billion in fiscal year 2001, with the following shares:

- Lincoln County – about $ 575 million
- Sublette County – about $ 850 million
- Fremont County – about $ 540 million
- Sweetwater County – about $1.4 billion

Mineral production in the study area is a major source of tax revenue for government entities. For instance, during fiscal year 2001, minerals accounted for nearly 73 percent of the value of property assessed in the study area. In addition, oil and gas production and operations provide a significant percentage of the assessed value of minerals. For 2001, oil and gas production accounted for 85 percent of all mineral valuation in the study area as assessed by the State. For Fremont and Sublette Counties, oil and gas production accounted for nearly 100 percent of all assessed mineral production. In addition, physical assets of the oil and gas industry (property) comprised 24 percent of all property assessed by local governments. Of all property and production assessed by the

State and local governments, oil and gas operations accounted for 67 percent of assessed value in the two counties in the study area during fiscal year 2001.

3.12.4.1. Ad Valorem Taxes – Counties

Ad valorem taxes from mineral production have been estimated based on production level, assessed values, and the effective tax rates. The counties generated $138 million in tax revenues from mineral production during fiscal year 2001. Of this $138 million, $127 million was derived from oil and gas production or 92 percent. Ad valorem taxes derived from mineral production accounted for 65 percent of total county tax levies in 2001. During fiscal year 2001, the four counties generated an estimated $7.2 million in property taxes associated with oil and gas extraction assets.

Table 3.12-5 estimates the importance of oil and gas operations in terms of local government property tax revenues. The four counties in the study area generated $135 million in tax revenues due to oil and gas operations. This accounted for 64 percent of property taxes generated in this area for Fiscal Year 2001.

3.12.4.2. Mineral Severance Taxes – State of Wyoming

Local government entities also benefit from severance taxes collected on mineral production throughout the State. Severance taxes collected on mineral production are distributed within the State according to a formula published in the State statutes. Severance tax revenues are distributed to a variety of sources including the State general fund, water development account, State highway fund, counties, cities and towns. Therefore, the government entities within the socioeconomic study area will only benefit from a percentage of severance taxes collected on production within the study area. However, these entities will also benefit from severance taxes collected on mineral production occurring in other parts of the State as well. Table 3.12-6 summarizes the total severance tax revenues that were distributed to the local government entities within the study area during fiscal year 2001.

Table 3.12-7 estimates the severance taxes that are generated from mineral production originating within the study area. The estimated severance taxes for each mineral type are based on production and assessed values and the effective tax rates, all which were obtained from the Wyoming Department of Revenue, Mineral Tax Division. Natural gas production generated the most severance tax revenue in the study area, accounting for 74 percent of all severance taxes generated.

3.12.4.3. Federal Royalties

Mineral production occurring on Federally owned public lands is also assessed a Federal mineral royalty. Production is assessed at 12.5 percent of value after allowable deductions. The Federal government returns fifty percent of the total royalties collected to the State where the mineral production occurred. In Wyoming, the distribution of the Federal royalties is based on a formula promulgated by the Wyoming State Statutes. The State allows a percentage of these Federal royalties to be distributed to cities and towns for planning, construction and maintenance of public facilities, capital construction funds and transportation projects. In addition, local school districts may benefit from Federal royalty payments thorough advanced entitlement grants for capital construction funds.

Total Federal royalties distributed to local government agencies in the study area for fiscal year 2001 were $4.2 million.

3.12.4.4. Mineral Tax Revenues

Historical oil and gas production data were used to estimate annual production for this area between 1974 and 2000 as is summarized in Figures 3.12-4 and 3.12-5. This area continues to be a very important area in terms of oil and gas production. For instance, Sublette County was the largest producer of natural gas and the fifth largest producer of oil of any county in the State in 2000.

Annual production data was used in combination with the average taxable valuation per unit and average tax and royalty rates to estimate ad valorem taxes (county), severance taxes (State) and Federal royalties. Oil and gas production occurring within the Pinedale RMPPA generated an estimated $221 million in mineral tax revenues to the county, State and Federal government during fiscal year 2001. Oil and gas production within the

Pinedale RMPPA accounted for 43 percent of the ad valorem taxes and 58 percent of the severance taxes generated in the four county study area in 2000.

3.12.4.5. Other Tax Revenue Sources

Other tax revenue sources that may be impacted by management actions associated with BLM-managed lands include lodging taxes, sales and use taxes, and gas taxes. Lodging taxes are relatively small compared to other tax sources, earning approximately one half million per year for these counties. Sales and use taxes generate between $2.4 and $5.3 million for Lincoln and Sublette Counties and $7 to $22 million in Fremont and Sweetwater Counties during the last three years.

3.12.4.6. Payment in Lieu of Taxes (PILT)

Each county in the study area receive Payments in Lieu of Taxes to compensate local governments for hardships caused by Federal lands being exempt from local property taxes. PILT payments are allowed in addition to other revenue sharing programs such as Federal mineral royalties and U.S. Forest Reserve payments. The PILT payment made to each county is based on a complex formula that takes into account revenue sharing from the previous year, county population, and acreage of the county in Federal ownership. PILT payments received by each of the four counties for the last ten years are summarized in Table 3.12-8.

3.12.5. ENVIRONMENTAL JUSTICE

Executive Order 12898, Federal Action to Address Environmental Justice in Minority Populations and Low-Income Populations, requires identifying and addressing disproportionately high and adverse human health and environmental effects of Federal programs, policies and activities on minority and low-income populations.

Relevant census data for counties within the study area were collected to determine whether the populations residing within the four study area counties constitute an "environmental justice population" by meeting either of the following criteria.

- At least one-half of the population is of minority or low-income status

- The percentage of population of minority or low-income status is at least 10 percentage points higher than for the entire State of Wyoming.

3.12.5.1. Population by Race

The population distribution by race is summarized in Table 3.12-9 for all counties in the socioeconomic study area. For Lincoln and Sublette Counties, minority populations are well below the State average while Fremont and Sweetwater Counties have minority populations that are above the State average.

In Fremont County, the minority population is more than ten percentage points above the State average. This is due to the large American Indian population that resides in the county on the Wind River Reservation. Further analysis will need to be conducted to determine if this minority population may be impacted by BLM actions.

3.12.5.2. Population in Poverty

Poverty level is often used as a determination of low-income status. The U.S. Census Bureau estimates poverty levels using a set of money income thresholds that vary by family size and composition. If a household's income is below the money threshold, then the family and all the individuals of that household are considered to be in poverty. Using this criterion, the Census Bureau provides estimates of the percentage of individuals that fall below the poverty level for each county in the U.S. Poverty estimates are also provided for different regions of the U.S. as well as the U.S. as a whole.

Table 3.12-10 summarizes the estimated poverty rates for the four counties in the socioeconomic study area, Wyoming, the West and the U.S. For three of the four counties, estimated poverty rates over the last decade have been below the State, regional and national averages. The exception is Fremont County where poverty rates are consistently estimated to be above the State and national averages.

The median household income in Lincoln, Sublette and Sweetwater Counties are above the State average, while poverty rates are lower than poverty rates throughout the State. This indicates the absence of low-income populations within these three counties that could be impacted by BLM actions. However, this is not the case in Fremont County, which reported a lower median household income and higher poverty rates than throughout Wyoming. However, the low-income population in Fremont County does not meet either of the criteria to be classified as an "environmental justice population".

3.13. SOILS

Soil resources in the Pinedale RMPPA consist of a wide variety of soil types. Many of the soils have developed from alluvium within the surrounding mountain ranges that were deposited over time by the Green River and its tributaries. Climate has had a significant influence on the types of soils that developed and their subsequent limitations. Impacts on the soil resource are the result of a wide variety of activities that include energy development and grazing. Soil resources support range and forest plant communities that stabilize the soil surface and protect the watershed. The potential for restoring these communities and conserving the soil resource is dependent on the soil types and how the resource is managed.

Surveying of the soils in accordance with National Soil Survey Standards as part of the National Cooperative Soil Survey is incomplete in the Pinedale RMPPA. Soils information from individual surveys that were conducted has not been correlated and is published in hard-copy reports that are beginning to deteriorate with age. There are inconsistencies between the soil surveys and the availability of data is limited. Resource-area-wide and other large-scale planning is limited by the inconsistencies and incompleteness of the soils database. The Pinedale RMPPA soil surveys should be completed, correlated into a single survey, and published in a computer database that is easily accessible to agency staff and the public. When completed, the Pinedale RMPPA soil survey should be entered into the Natural Resource Conservation Service (NRCS) format for accessing soil survey information.

Analysis of soil characteristics and potential limitations to development within the area is restricted by the incompleteness and current condition of the soil database. Identifying the locations of highly erodible, saline, sodic, shallow, and sandy soils along with other important soil features is difficult and time consuming as a result of the present soils database.

3.13.1. SOIL SURVEYS

Portions of the Pinedale RMPPA have been mapped by five different soil surveys (see Figure 3.13-1 for survey locations). These soil surveys date from 1982 through 1997. Two of the soil surveys were completed by private contractors as baseline data for the Riley Ridge Natural Gas Environmental Impact Statement (EIS). The BLM contracted two large areas to be surveyed during 1983 and 1987 by private contractors. The final area surveyed was completed by a BLM staff soil scientist in 1997. Three large areas in the northern part of the area along with small-scattered parcels of BLM-managed lands still need to be surveyed.

All of the soil surveys were conducted on an Order III intensity level. The soil lines and components are variable and designed for large-scale planning. Information in these soil surveys may be used to determine potential limitations for proposed projects, but site-specific investigations should always be conducted as part of the project development process.

3.13.1.1. Soapholes Survey

The Soapholes soil survey investigated soil resources in the Soapholes Basin south of Daniel, Wyoming and is bordered on the west by U.S. Highway 189, on the south by Cottonwood Creek, and on the east by the Green River (BLM 1997). This survey was conducted in the mid 1990s by a BLM soil scientist who finished the report in 1997. Private lands west of the Green River are not included in the soil survey. Soil names and map unit numbers were taken from the NRCS working legends in Sublette, Lincoln, and Uinta County soil surveys and from the Big Piney-LaBarge soil survey. Data from soil surveys conducted for the proposed West Side Canal project and for Desert Land entries in the Soapholes were incorporated into the Soapholes survey without modification or extensive field checking.

Soils along the western flank developed from the Wasatch (e.g., shale, mudstone, and sandstone) and Green River (e.g., limestone) formations have an estimated precipitation range of 7 to 9 inches. The glacial outwash terraces, till terraces, and drainages on the eastern flank have an estimated precipitation range of 10 to 14 inches. Low areas within the Soapholes Basin were identified as having saline soils that may be the result of seepage from unlined canals and irrigation on private lands.

General use and management limitations are correlated to the range of such characteristics for each soil series. The soil survey indicates that accelerated soil erosion by both wind and water are a problem along the western part of the area, resulting in gullying on livestock paths and two-track roads. Drainage headcutting is also a problem, and pedestaling and deposition are problems in areas affected by wind erosion.

3.13.1.2. Burma Road Soil Survey

The Burma Road soil survey, which covers approximately 220,00 acres in the southeastern part of the area, was conducted during the 1987 field season by a private contractor (ERO 1988). The climate in the Burma Road survey area is semiarid and continental with short dry summers and long cold winters. The estimated average precipitation is 7 to 9 inches based on soil development and vegetation.

General use and management limitations are correlated to the dominant established soil series in each map unit. The characteristics and use limitations for each map unit are those previously established for each soil series based on its geographical range of occurrence.

3.13.1.3. Big Piney – LaBarge Soil Survey

The Big Piney - LaBarge soil survey was conducted for the BLM by a private contractor during the 1983 and 1984 field seasons (ERO 1984). Soils were mapped to the soil series level with slope phases. Portions of this soil survey are summarized in the Big Piney - LaBarge Coordinated Activity Plan (CAP) Soils and Vegetation Technical Report (BLM 1990).

Climate was separated into three zones based on temperature and precipitation for this survey. The 7- to 9-inch precipitation zone occurs at the lowest elevations (6,500 to 7,200 feet) and has an estimated growing season of 90 to 100 days. The mid-elevation zone has an average precipitation range of 10 to 14 inches and an estimated growing season of 75 to 90 days. The higher elevation zone has an average precipitation range of 15 to 19 inches and an estimated growing season of 70 to 85 days.

General use and management limitations are correlated to the dominant established soil series in each map unit. The characteristics and use limitations for each map unit are those previously established for each soil series based on its geographical range of occurrence.

3.13.1.4. Riley Ridge Soil Survey, North and South Areas

The Riley Ridge soil survey was completed as part of the Riley Ridge Natural Gas Project EIS in 1982 (Environmental Research Technology, Inc. 1983). The climate in this area transitions from 7 to 9 inches of annual precipitation at lower elevations at the east edge of the survey area up to approximately 15 to 19 inches along the west boundary with the Bridger-Teton National Forest. Effective precipitation amounts are very dependent on slope and aspect with steep north-facing slopes having a greater amount of effective precipitation than comparable south-facing slopes.

The north and south areas of this soil survey were separated by a soil survey conducted in the central portion of the Riley Ridge area by another contractor. Limited correlation was done between the two soil surveys. This soil survey is summarized in the Big Piney - LaBarge CAP Soils and Vegetation Technical Report (BLM 1990).

This soil survey identified highly erodible soils, saline soils, sandy soils, and soils with a high percentage of rock fragments as being present and requiring special management. Most of the identified soil types were correlated to established soils series. Use and management limitations were correlated to those established as the range of characteristics for the soil series.

3.13.1.5. Riley Ridge Soil Survey, Central Area

This soil survey was completed in 1982 by a private contractor as part of the Riley Ridge Natural Gas Project EIS (Bio/West 1982). It was the first in a series of soil surveys conducted in the Pinedale RMPPA. Existing Soil Conservation Service (now the NRCS) farm and ranch survey legends were used as the basis for making the soil survey and correlating it to soils previously identified in the area. There was limited correlation done between this soil survey and the one conducted in the north and south portions of the Riley Ridge EIS area. The BLM has experienced difficulty using this soil survey. Additional fieldwork is needed before it can be used as a dependable Order III soil survey. This soil survey is summarized in the Big Piney - LaBarge CAP Soils and Vegetation Technical Report (BLM 1990).

Because access onto and through private lands was limited during this soil survey, aerial photo interpretation was used to identify soils in inaccessible areas, based on landform and vegetation. Soil types were identified to taxonomic family and a few correlated to established soil series.

The climate in this area transitions from 7 to 9 inches of annual precipitation at lower elevations at the east edge of the survey near Wyoming Highway 235 and increases to approximately 15 to 19 inches along the west boundary with the Bridger-Teton National Forest. Effective precipitation amounts in this area are very dependent on slope and aspect with steep north-facing slopes having a greater amount of effective precipitation than comparable south-facing slopes.

Identification of general use and management limitations beyond identification of soil type was not part of this soil survey.

3.13.1.6. Unmapped Areas

Soils in three large areas, as well as smaller areas in the north and east portions of the Pinedale RMPPA, are not included in any of the existing Order III soil surveys. Some of the unmapped areas include portions of the area where oil and gas development either is underway or planned for the near future. There are no BLM plans to conduct soil surveys in these areas.

The digitized soil database for the area substitutes information from the Wyoming general soils map for unmapped areas. This soils information is based on remote sensing of aerial photography without field documentation and therefore is not recommended for site-specific planning.

3.13.2. SOIL CONDITIONS AND CHARACTERISTICS

The soils in the Pinedale RMPPA are susceptible to several limitations that reduce the potential for establishing vegetation following a disturbance. These soil limitations include highly erodible soils, saline soils, sodic soils, and sandy soils.

Soils that are considered susceptible to these limiting features are discussed in the following subsections.

3.13.2.1. Highly Erodible Soils

Highly erodible soils are characterized by the loss of valuable topsoil by either wind or water. Erosion increases when the vegetative community is disturbed by intense grazing, fire, road construction, and any other use that reduces the amount of vegetative cover. Management in areas with severe water erosion potential should minimize impacts so that erosion and sediment yield are not accelerated.

Several soils in the Pinedale RMPPA are red in color and have a history of erodibility when disturbed. These soils include Almy, Chedsey, Cundick, Eighteen, Iyers, Jerry, Kismet, Nineteen, Redhill, and Stovho soil series. The Forelle soil does not have a red color, but is considered highly erodible.

3.13.2.2. Saline Soils

Soil salinity can have significant impacts on soil erosion and reclamation potential. Because erosion of saline soils can also have significant impacts on downstream water quality, saline soils are managed to minimize impacts in these areas and to promote revegetation of previously disturbed areas to the best extent possible. Cambarge, Chrisman, Dines, Fluvents-saline, Laney, Mone-saline, Sandbranch, and Tresano variants are some of the soils in the area that have high salt contents (BLM 2002, BLM 1990).

Saline sediments that originate in the area eventually flow into the Colorado River. Salinity levels in the Colorado River are a regional, national, and international issue. Control of sediment discharged from public lands is mandated by the Colorado River Basin Salinity Control Act of 1974. Proper land use is the BLM-preferred method of achieving salinity control with the planning process being the principal mechanism for implementation.

3.13.2.3. Sodic Soils

Soils with sodium adsorption ratios (SARs) of 13 or greater are considered sodic. Infiltration of precipitation into these soils is reduced by the dispersion of soil particles caused by the higher levels of sodium. Reduced infiltration rates result in greater surface runoff rates, and increased soil erosion and sediment yields. Many of these soils have a thin layer of suitable soil above the sodic horizon, so when this layer is disturbed or removed, the resulting impact can be irreversible. Management of sodic soils minimizes the impacts of grazing and other surface disturbances, such as road construction and fire. Soil series in the Pinedale RMPPA with SAR values in excess of 13 include, but may not be limited to, Blazon, Bosler, Bodorumpe Charlos variant, Coalmount, Cora, Dinnen, Foxcreek, Gelkie, Edlin, Haterton, Heath, Laney, Littsan, Millerlake, Maurice, Paulson, Rickman, Tineman, and Westvaco (BLM 2002, BLM 1990).

3.13.2.4. Sandy Soils and Sand Dunes

Sandy soils are highly susceptible to wind erosion and efforts are made to avoid disturbing these areas. Sandy soil series include, but may not be limited to, Crestman, Eightyfive A-B-C, Koonich variant, LaMarsh, Littsan variant, Ryan Park, and Space City soil series (BLM 1990).

3.13.2.5. Oil and Gas Roads

Construction and maintenance of roads within the Pinedale RMPPA is an important issue affecting soil resources. Development of additional roads and maintenance of existing roads should be based on the ability of local soils to support these activities. Site-specific soils evaluations must be conducted prior to construction of any new roads. Roads should be graded to shed water, and conventional drainage measures should be properly installed. With the exception of hard surface all-weather roads, most of roads in the area are constructed from local soils or improved with gravel.

Soil properties that are limiting to construction of roads within the area include sodium content, gypsum content, soluble salts, low strength, shrink-swell potential, and frost action. Content of large stones, depth to hard bedrock, and slope are also important physical features that must be considered when determining the suitability of soils for road construction.

3.13.2.6. Reclamation of Drastically Disturbed Areas

Many of the soils within the Pinedale RMPPA have limiting features that make reclamation and revegetation difficult. These limiting features include salinity, sodium content, clayey and sandy textures, droughty conditions, alkalinity, low organic matter content, shallow depth to bedrock, stones, and cobbles, and wind erosion. Sometimes the soil limitations are so severe that areas cannot be reclaimed after disturbance. Management of the soil resource in these areas minimizes the impacts of road construction, grazing, fire, and other activities that disturb the soil surface. Suitable soil materials should be salvaged and stockpiled separately from the unsuitable soils whenever impacts are probable.

3.13.2.7. OHV Use

Operation of OHVs can impact the native soil surface and biological crusts, especially in areas where erosion control and revegetation are difficult. Soil features that may limit the use of areas for OHV operation are clayey soils, salinity, sodium content, slope, water erosion, and depth to saturated soils. OHV use within the Pinedale RMPPA should be managed so that impacts to the soil resource are minimized. (Refer to Section 3.9 for further discussion of OHV use.)

3.13.3. ANALYSIS OF SOIL TRENDS

Soil surveys are a basis for determining the current condition and potential limitations of soils in the Pinedale RMPPA, but do not provide information or data on soil processes such as soil erosion and biological crusts. Potential erosion rate values can be obtained by evaluating parameters such as K factor, T factor, slope, hydrologic group, and the wind erodibility group. Information that can be used to evaluate trends within the area for either soil erosion or biological crusts is not available at the present time.

3.13.3.1. Soil Erosion

The Pinedale RMPPA does not presently have any baseline data on soil erosion. A soil erosion evaluation method such as the Pacific Southwest Inter-Agency Committee (PSIAC) monitoring method should be used to collect soil erosion data at representative locations within the area.

Reduction of sediment and salinity entering the Colorado River system continues to be an important issue for the area. Specific areas that contribute major amounts of saline sediment to the Colorado River cannot be identified without monitoring soil erosion rates over time.

Baseline data should be collected in representative areas to establish the current condition of soil erosion and biological crusts. This data can then be compared with soil erosion data collected in 5, 10, 15, and 20 years to verify the trend of these soil processes. Comparison of these data sources can be used to evaluate if management practices are having a positive or detrimental effect on the soil resource, as well as other dependent resources.

3.13.3.2. Changes Associated with Surface Disposal of Groundwater

Disposal of groundwater directly into surface drainages is an issue that has recently developed in the Pinedale RMPPA. Large amounts of water can be generated from coal bed methane wells, gas wells, and oil wells. This water can be saline and sodic. Discharge of this water directly into surface drainages can have a detrimental effect on native riparian vegetation. The present policy of the area is to require that low-quality water generated from these and similar sources be re-injected into deep wells.

Salts from both natural sources and industrial developments that originate in the Pinedale RMPPA eventually flow into the Colorado River. Salinity levels in the Colorado River are a regional, national, and international issue. Control of salts discharged from public lands is mandated by the Colorado River Basin Salinity Control Act of 1974.

3.14. TRANSPORTATION AND ACCESS

Transportation activity within the Pinedale RMPPA is associated with recreational and non-recreational use of the land. This section describes the current transportation and access structure of this area.

3.14.1. BASIC TRANSPORTATION STRUCTURE

Two major highways traverse the Pinedale RMPPA in a north-south direction: U.S. Highways 191 and 189. U.S. Highway 191 lies on the east side of the area and U.S. Highway 189 lies on the west side. State Highways 235, 350, 351, 352, 353, and 354 are all within the area. State Highway 351 is a major east/west access through the Pinedale RMPPA. The road systems for Sublette and Lincoln Counties consist of limited paved roads and a network of unpaved roads.

The BLM-managed transportation system is extensive and complements the public road system. These roads are primarily improved dirt roads. Not all of the roads are maintained. Roadways managed by the BLM are often used to access private interests. Burma Road, Luman Road, Paradise Road, and East Green River Road provide access to areas with ongoing oil and gas exploration projects, specifically Jonah Field. The BLM uses a simple numbering system for its roadways, ranging from 5101 to 5424. Functional classification of roadways, which also determines design speeds, is determined by the BLM Manual Section 9113. The following paragraphs describe each roadway classification:

- Collector Roads. - These BLM-managed roads normally provide primary access to large blocks of land, and connect with or are extensions of the public road system. Collector roads accommodate mixed traffic and serve many uses. Within the BLM-managed system, collector roads receive the highest volume of traffic
- Local Roads. - These BLM-managed roads normally serve a smaller area than collector roads, and connect to collector roads or public road systems. Local roads receive lower volumes, carry fewer traffic types, and generally serve fewer uses. Commonly, local roads in mountainous terrain are single-lane
- Resource Roads. - Normally, these BLM-managed roads are spur roads that provide point access and connect to local or collector roads. They carry very low volume and accommodate only one or tow types of use. Use restrictions are applied to prevent conflicts between users needing the road and users attracted to the road.

Design for these roadways follows the standards set by the American Association of State Highway and Transportation Officials (AASHTO) "Policy on Geometric Design of Highways and Streets." Maintenance is primarily the responsibility of the BLM; however, some roads are jointly maintained with the Forest Service.

A network of private roads serves private land holdings, most extensively the oil and gas industry. These roads are maintained by the private landowner.

3.14.2. ACCESS POLICIES

Access across private land is a continuing issue within the Pinedale RMPPA. BLM's current policy is to acquire only such lands or interest in lands that are identified through land use planning as being essential for the management of BLM-administered lands and resources. Needs are ranked with other access needs throughout the State to determine how the limited resources for acquisition are utilized. Easements are generally obtained by one of the following:

- Perpetual Exclusive – A perpetual right acquired by the United States to use land of another for a particular purpose, such right being acquired exclusively by the United States and excluding others from enjoying the same privilege unless specifically authorized by the United States.
- Perpetual Nonexclusive – A perpetual right acquired by the United States to use land of another for a particular purpose, such right not being granted exclusively to the United States and not excluding others from enjoying the same privilege.
- Temporary Nonexclusive – A method similar to perpetual nonexclusive, except that the grant is for a period of time as specified in the conveyance document.

To establish joint agency cooperation when acquiring access to public lands, the BLM has a Memorandum of Understanding (MOU) with the Wyoming Board of Land Commissioners, Forest Service, and the Wyoming Game and Fish Department. The BLM currently has a priority list established for acquisition of easements.

3.14.2.1. Access

The Pinedale RMPPA is bisected by numerous roads and trails on a variety of land ownerships and under various maintenance responsibilities. Road surfaces range from 6- to 8-foot-wide two-track jeep trails to modern two-lane (45- to 50-foot wide) highways. The roads serve numerous purposes including public access, landowner access, oil and gas development access, as well as supporting the resource management activities carried out by the BLM and other entities. Some roads are off-limits to the public.

As it relates to access issues, lands within the Pinedale RMPPA are typically consolidated. However, some parcels are privately held and affect the adjacency of public lands. Because the BLM must ask permission to cross these lands, management of property can be disjointed. Currently, there are three major initiatives to acquire private land for access in three locations: Miller Mountain, LaBarge Creek, and a large parcel east of Highway 353 and just south of Silver Mountain. These areas are illustrated on Figure 3.14-1.

3.14.2.2. Off-Highway Vehicle Use

Although OHV use is present throughout the area, critical problems have been identified at Silver Mountain, Red Canyon, and the Wind River Front. Increased use of OHVs has created a visual impact as well as an environmental impact. These impacts are further discussed elsewhere in this document (OHV, Section 3.9; Visual Resource, Section 16).

3.15. VEGETATION

Vegetation is an important resource on BLM-managed lands, especially for overall range health and wildlife forage value. This section describes the vegetation resource the

Pinedale RMPPA, including general vegetation communities, special status species, riparian areas, and noxious weeds.

The resource area is a high-elevation, cold-desert ecosystem. Bailey's ecoregion classification identifies two provinces within the Pinedale RMPPA (Figure 3.15-1) (Bailey 1995). The majority of the area, roughly the eastern two-thirds, is within the intermountain semidesert province, which is comprised of the Wyoming Basin and the Columbia–Snake River Plateaus. The portion of the Pinedale RMPPA that lies within this province is a portion of the Wyoming Basin. It consists of plains at elevations of 6,000 to 8,000 feet, with isolated hills and low mountains up to 2,000 feet higher. The high elevation of the Wyoming Basin results in cold winters and short, hot summers. The majority of the vegetation is described as sagebrush steppe (Bailey 1995).

The remainder of the Pinedale RMPPA is within the southern Rocky Mountain steppe–open woodland–coniferous forest–alpine meadow province of the middle and southern Rocky Mountains. This ecoregion province is characterized by high-elevation plateaus and mountain slopes. The climate is influenced by prevailing west winds, and east slopes are more arid than west slopes. A variety of vegetation communities are found within this province and are determined by elevation, slope aspect, and climate (Bailey 1995). In the subject area, these include primarily, big sagebrush, aspen woodlands, and conifer communities.

Vegetation change over time for the Pinedale RMPPA is available from the University of Wyoming's Normalized Difference Vegetation Index (NDVI). These data are a result of comparisons between Landsat Multi Spectral Scanner images from the 1970s, 1980s, and 1990s. The data were projected to a 1:100,000 map scale with grid values based on relative amounts of vegetation decrease and increase. There has been minimal change over the majority of the Pinedale RMPPA. Few areas show significant increase in vegetation, while some areas along tributaries to the Green River show significant decrease in vegetation. A figure showing the NDVI data is not included in this document, based on the overall lack of change in the area.

Vegetation communities within the Pinedale RMPPA are described in following sections. The source of information concerning vegetation communities within the area is the University of Wyoming's Gap Analysis Program (WY-GAP) vegetation analysis data and land cover map. The GAP land cover is a result of interpretation of Landsat Thematic Mapper imagery (1994). There are some other sources of land cover available for portions of the Pinedale RMPPA, but the GAP data are used in this document due to its comprehensive coverage of the area.

3.15.1. GENERAL VEGETATION

The majority of the Pinedale RMPPA is dominated by sagebrush and mountain shrub communities with some riparian-, saltbush-, and woodland-dominated areas. Vegetative composition and density is a function of climate, soils, and disturbance variations. Vegetation zones mapped using combinations of the GAP analysis plant communities include riparian/wetland, grasslands, big sagebrush, other shrub, aspen woodlands, lodgepole pine, other conifer, and barren (Figure 3.15-2). In addition, open water and areas of human impact, such as urban/settlement areas and cropland, are mapped. Table 3.15-1 displays the acreage of cover for each mapped vegetation zone.

3.15.1.1. Riparian and Wetland Communities

Riparian and wetland communities are the transition zones between terrestrial and aquatic ecosystems (Gregory et al. 1991). These communities are found in moist areas along perennial or intermittent drainages, seeps, and springs. Soils typically consist of deep, rich loams with high amounts of organic matter. Due to the high productivity of riparian areas, they are very important resources for wildlife and livestock. The lush vegetation in riparian communities provides valuable food and cover; if water is present, the importance of these areas increases even more.

Historically, the riparian and wetland communities have been highly impacted by human activity due to the hydrology and productivity of these areas. Urban development, water diversions, and agricultural activities along drainages have led to clearing of large amounts of riparian vegetation throughout the west. In addition, livestock grazing has had a large impact on riparian areas, as high moisture and lush vegetation result in a concentration of cattle activity in these areas.

Within the Pinedale RMPPA, riparian/wetland vegetation types include riparian forest, shrubland, and herbaceous meadow/wetland areas. Together, these three categories of vegetation types make up approximately 54,454 acres and approximately 3.4 percent of the area. These categories are mapped as a single zone on Figure 3.15-2, and are individually described in more detail in the following subsections.

3.15.1.1.1. Forest- and Shrub-Dominated Riparian Communities

Riparian forest communities in the Pinedale RMPPA are dominated by narrow-leaved cottonwood (*Populus angustifolia*) with an understory of shrub, forb, and grass species. These communities cover approximately 19,547 acres, or 1.2 percent, of the Pinedale RMPPA.

Shrub-dominated riparian communities consist of high densities of various willow species (*Salix* spp.) with an understory of grasses, sedges, and forbs. These communities cover approximately 33,970 acres, or 2.1 percent, of the Pinedale RMPPA.

3.15.1.1.2. Herbaceous Riparian and Wetland Communities

Herbaceous riparian and wetland communities include moist meadows and irrigated hay fields along drainages. Moist meadow communities are dominated by herbaceous riparian and/or wetland species. Herbaceous riparian and wetland communities only comprise approximately 937 acres, less than 1 percent, of the Pinedale RMPPA. They occur in areas of high moisture, such as near springs or seeps, supporting mesic or wetland herbaceous vegetation.

Additionally, hay fields are located in privately-owned riparian corridors of the Pinedale RMPPA. Both native and improved seeded species such as Kentucky bluegrass (*Poa pratensis*) are present in these communities.

3.15.1.2. Grassland communities

Grasslands make up less than 1 percent of the Pinedale RMPPA, and are primarily found in the western portion of the Pinedale RMPPA on shallow ridges of the Overthrust Belt (BLM 1985). Patches of grasslands are found scattered throughout low- and high-density sagebrush communities. These grassland communities provide important habitat and forage for wildlife. Grass species dominate these communities, but shrubs, sub-shrubs, and cushion plants are also common. Included within the grassland mapping zone is a small area (304 acres) of subalpine meadow in the western portion of the Pinedale RMPPA.

3.15.1.3. Sagebrush Communities

Sagebrush communities are the most extensive plant cover type not only in the Pinedale RMPPA, but also in the surrounding Wyoming Basin area and intermountain region. Sagebrush communities cover approximately 1,090,532 acres (68 percent) of the Pinedale RMPPA. Adaptations to different habitat characteristics such as soil type, climate, and elevation have resulted in a variety of sagebrush species in the western U.S. (Monsen and Shaw 2000). Sagebrush communities in the Pinedale RMPPA are dominated by one of two species, Wyoming big sagebrush (*Artemisia tridentata wyomingensis*), or mountain big sagebrush (*Artemisia tridentata vaseyana*), with a well-established grass and forb component. Wyoming and mountain big sagebrush communities are described in subsections 3.15.1.3.1 and 3.15.1.3.2, respectively.

Native sagebrush communities across the west have been altered by changes to the natural fire regime and disturbances such as herbicides, cultivation, excessive grazing, and insect activity (BLM 1989). European settlement and impacts in sagebrush-dominated regions brought about changes in many of these areas, including an increase of sagebrush density, introduction of non-native species, and reduced numbers of certain native grasses and forbs (Tisdale and Hironaka 1981).

Overgrazing by livestock tends to deplete sagebrush communities of their native grass and forb element, resulting in increases of density of sagebrush or, alternatively, invasion of exotic weedy species (BLM 1999b). Wildfires in sagebrush communities have increased in numbers and intensity compared to historic levels. Across the west, a contributing factor is the invasion of cheatgrass (*Bromus tectorum*), which results in a high fuel load that causes an increase in fire frequency (Monsen and Shaw 2000). Sagebrush can be slow to reestablish after fire, encouraging the conversion of sagebrush to grasslands.

3.15.1.3.1. Wyoming Big Sagebrush

Wyoming big sagebrush is the most xeric of sagebrush species. Within the Pinedale RMPPA, Wyoming big sagebrush communities are found at elevations of 7,000 to 7,500 feet. Canopy cover of sagebrush in high-density areas is typically greater than 35 percent. Wyoming big sagebrush covers approximately 823,495 acres (52 percent) of the Pinedale RMPPA. Species commonly associated with Wyoming big sagebrush include various other shrubs, grasses, and forbs.

3.15.1.3.2. Mountain Big Sagebrush

Mountain big sagebrush generally grows above 7,800 feet in portions of the Pinedale RMPPA that receive annual precipitation amounts of 15 inches or more. In the Pinedale RMPPA, this translates to approximately 267,037 acres, or 16.5 percent, of the total area.

3.15.1.3.3. Low-Density Sagebrush Communities

Low-density sagebrush communities are found in basins and are characterized by shrub canopy cover of less than 35 percent. Various species of sagebrush may dominate, including big sagebrush (*Artemisia tridentata* var. *tridentata*), black sagebrush (*A. nova*), alkali sagebrush (*A. longiloba*), and three-tip sagebrush (*A. tripartita*). In low-density areas dominated by Wyoming big sagebrush, associated species are similar to those for Wyoming big sagebrush communities. Additional common species associated with Wyoming big sagebrush in low-density areas include spiney hopsage (*Grayia spinosa*) and horsebrushes (*Tetradymia* spp.).

Also included in the low-density sagebrush classification are low growing sagebrush communities found on dry, windy ridges and/or areas with shallow soil.

Low-density sagebrush communities are mapped with other sagebrush communities in Figure 3.15-2.

3.15.1.4. Mountain Shrub Communities

Mountain shrub communities include dominant shrub vegetation other than sagebrush. These communities are found within sagebrush communities in areas that receive additional moisture from snowbanks, seeps, and springs (BLM 1986). Common associated species of mountain shrub communities are similar to those of mountain big sagebrush communities. In Figure 3.15-2, mountain shrub communities are mapped with big sagebrush.

3.15.1.5. Other Shrub Communities

3.15.1.5.1. Saltbush Communities

Saltbush communities include two types – saltbush and half-shrub communities. Saltbush communities are typically found on soils with high salt or exchangeable sodium content, including badland clay soils, colluvial deposits, and alluvial outwashes. Salt-tolerant species inhabit these areas, and Gardner's saltbush (*Atriplex gardneri*) is usually dominant (BLM 1986). Saltbush communities occur within sagebrush communities, and are not mapped separately in Figure 3.15-2.

Half shrub communities consist of shallow-rooted, salt tolerant species such as bud sagebrush, winterfat, buckwheats (*Eriogonum* spp.), Gardner's saltbush, low rabbitbrush, spineless horsebrush, rhizomatous wheatgrass, and squirreltail. Soils tend to be heavy clay with slow permeability, sometimes shallow with shale bedrock in basins and flatlands (BLM 1986).

Value of saltbush communities includes wildlife and livestock forage. Management and manipulation of these communities is strongly limited by climate and soils. Any management decisions concerning saltbush communities are implemented only after thorough analyses of community health, structure, and potential (BLM 1986).

3.15.1.5.2. Greasewood Communities

Greasewood communities are found in basins in heavy, dense alkaline soils or on the west side of the Green River in upland areas with neutral to alkaline sandy clay soils. Generally, these communities are not valuable for forage due to low productivity associated with the alkaline soil. Within the Pinedale RMPPA, greasewood communities cover nearly 7,000 acres, less than 1 percent, of the total area. In Figure 3.15-2, greasewood and desert shrub communities are mapped together as the "other shrub" zone.

3.15.1.5.3. Desert Shrub Communities

Desert shrub communities cover 61,050 acres (3.8 percent), and are found primarily in the southern portion of the Pinedale RMPPA. These communities occur in sandy soils in zones with precipitation of 7 to 9 inches per year. Spiney hopsage, rabbitbrush, and sometimes horsebrushes dominate desert shrub communities. The grass and forb component is similar to that for the sagebrush community, with Indian ricegrass often the dominant grass (BLM 1986). Desert shrub communities and greasewood communities make up the "other shrub" zone in Figure 3.15-2.

3.15.1.6. Forest and Woodland Communities

Forest and woodland communities are represented by broadleaf woodland communities.

Broadleaf woodland communities within the Pinedale RMPPA include aspen stands, cottonwood, and willow communities. Cottonwood and willow communities are described in the previous discussion of riparian communities. Aspen stands occur in areas with high moisture availability such as on northern and eastern exposures where snow packs accumulate. They also tend to occur on the edges of conifer stands, as a transition between sagebrush and conifer zones. Aspen stands cover 55,370 acres of the

Pinedale RMPPA. The understory component of aspen stands includes a mix of shrubs, grasses and forbs.

Aspen communities are important forage areas for both livestock and wildlife. These communities also have recreational value for scenery, camping, and hunting. Overgrazing of these communities can lead to depletion of the understory component, resulting in a decrease in forage value. Aspen stands have evolved with fire as a regular occurrence. Disturbance from things such as logging or fire is necessary to promote root sprouting of aspens. Without some type of disturbance to encourage new trees, aspen stands will eventually die out and often will be replaced by conifer communities (DeByle 1985).

3.15.1.7. Conifer Communities

The western, northern, and eastern edges of the Pinedale RMPPA contain conifer communities. Lower elevation conifer communities are found on northern and eastern slopes, while those in higher elevations are more extensive and are found on all slopes (BLM 1986). Conifer communities contain several vegetation types including lodgepole pine (*Pinus contorta*), subalpine fir (*Abies lasiocarpa*), limber pine (*Pinus flexilis*), Douglas fir (*Pseudotsuga menziesii*), Engelmann spruce (*Picea engelmannii*), blue spruce (*Picea pungens*), and mixed conifer communities. Dominant conifer species are an indication of elevation, slope aspect, soil characteristics, and climate. For the purposes of this document, discussion of conifer communities will be divided into two sections, lodgepole pine communities and "other conifer" communities.

3.15.1.7.1. Lodgepole Pine

Lodgepole pine often occurs in dense, pure stands with little understory. However, as the stand ages, shade-tolerant conifer species, such as spruce and fir, become established in the understory. Historically, before alteration of fire regimes by humans, fires would wipe out the stands before the other conifer species could become dominant. Lodgepole is dependent upon fire for regeneration. Cones often retain seeds until fire or cutting causes opening and dispersal of seeds, and lodgepole are often the first trees to become established after fires (BLM 1989, ESA 2002). If fire does not occur, the stand may become dominated by other conifer species.

In addition to providing timber, an economic resource, lodgepole forests are valuable as cover for wildlife such as elk. In the Pinedale RMPPA, lodgepole forests cover 41,600 acres and make up approximately 2.6 percent of the area.

3.15.1.7.2. Other Conifer

Other conifer communities in the Pinedale RMPPA may be dominated by subalpine fir, limber pine, Douglas fir, Engelmann spruce, blue spruce, or by a mixture of any of the above species. Of these species, Douglas fir is the most likely to be found dominating on its own in stands with an understory of bunchgrasses in drier areas, or shrubs, grasses, and forbs in more mesic zones. More often, Douglas fir is mixed with Englemann or blue spruce (BLM 1989).

Spruce-fir forests are dominated by subalpine fir and Englemann spruce. Limber pine, Douglas fir, lodgepole pine, and blue spruce are also associated with these communities (BLM 1989). Mixed conifer forests are often dense with a large amount of accumulated litter, and little understory growth (BLM 1989).

In the Pinedale RMPPA, approximately 10,049 acres, less than 1 percent, of the total area, is made up of the “other conifer” vegetation zone, as illustrated in Figure 3.15-2

The most important management issue in the other conifer communities is fire. Before human manipulation of fire regimes, these communities were exposed to frequent understory fires. These fires kept the understory growth and dead woody fuel to a minimum. Accumulation of fuel and understory growth causes the fires that do burn in these areas to burn more intensely and spread to crowns of mature trees. In addition, continued prevention of fires in forest communities results in a change of forest composition, as fire-adapted species such as lodgepole and aspen will eventually be replaced by species not tolerant of fire.

3.15.1.8. Barren Communities

Areas with very little or no vegetative cover include steep slopes, rock outcrops, and badlands in addition to areas impacted by roads and other types of non-urban development. Barren communities account for 5,664 acres of the Pinedale RMPPA. Due to low production of forage or cover, value to wildlife and livestock in these communities is low, though rock outcrop areas do provide nesting and perching habitat for raptors.

3.15.1.9. Agricultural/Urban Communities

Agricultural areas cover 284,132 acres (17.5 percent) of the Pinedale RMPPA, including both irrigated and dry-land crops. The majority of the agricultural area is irrigated croplands. Some dry-land crops are grown in upland areas away from drainages (5,283 acres). Crops grown in the Pinedale RMPPA include hay species such as Kentucky bluegrass and alfalfa.

Urban settlements in the Pinedale RMPPA account for 732 acres and include the towns of Pinedale, Boulder, and Daniel Junction in the northern portion; Big Piney and Marbleton in the central area; and Le Barge and Farson in the southern portion. These locations are combined with croplands as the agricultural/urban zone on Figure 3.15-2.

3.15.2. SPECIAL STATUS PLANT SPECIES

Sensitive plants such as those listed as Federally-threatened, endangered, or candidate species, or those given other special designations, are known as “special status species.” These plants have been given this designation because they have an increased risk of extinction due to unique habitat attributes and restricted distribution areas. For these reasons, the populations of special status species are of great conservation interest.

The BLM and Forest Service are among the Federal agencies that have adopted policies to protect species designated by the USFWS as threatened, endangered, or candidate species under the Endangered Species Act (ESA) of 1973. The BLM and Forest Service also have their own “sensitive” designation for rare plants that exist within their management areas. In addition to USFWS-, Forest Service-, and BLM-listed species, those ranked under The Nature Conservancy's (TNC's) Natural Heritage ranking system are also discussed in this document.

The following subsections describe the special status species with potential or known populations in the Pinedale RMPPA.

3.15.2.1. Federally Listed Species

Of the 17 Federally listed species, Ute ladies'-tresses is the only plant listed by USFWS under the ESA. Meadow pussytoes, Trelease's racemose milkvetch, Cedar Rim thistle, large-fruited bladderpod, Beaver Rim phlox, and tufted twinpod are Wyoming BLM sensitive species. Meadow pussytoes and Payson's bladderpod are Forest Service Region 4 sensitive species, and Swallen Mountain ricegrass and Big Piney milkvetch are special status species of the BLM Rock Springs Field Office. These are described in detail below.

- Ute Ladies'-Tresses - Ute ladies'-tresses, a threatened species, has not yet been identified in southwest Wyoming, although potential habitat does exist. Habitat includes areas associated with springs, lakes, rivers, or perennial streams at elevations of 1,800 to 6,800 feet (Fertig 1999). Populations are known from along the base of the eastern side of the Rocky Mountains in portions of Wyoming, Montana, and Colorado. Populations are also known from the upper Colorado River Basin, especially in the Uinta Basin; areas along the Wasatch Front and westward in the eastern Great Basin; in north-central and western Utah; and extreme eastern Nevada. Populations have also been discovered in Nebraska, Idaho, and Washington. The riparian/wetland habitats for Ute ladies'-tresses have been heavily impacted by development and stream channelization and other watershed alterations. Potential habitat within the Pinedale RMPPA includes riparian and wetland communities at elevations below 6,800 feet. The majority of the Pinedale RMPPA is above 6,800 feet, therefore, the presence of Ute ladies'-tresses is unlikely, but should not be ruled out.

- Meadow Pussytoes - Meadow pussytoes is a regional endemic listed by both USFS Region 4 and Wyoming BLM as sensitive. It is ranked in the Natural Heritage Network as global and State imperiled. Meadow pussytoes grows in subirrigated meadows within broad stream channels at elevations of 4,950 to 7,900 feet. Species commonly found in association include tufted hairgrass (*Deschampsia cespitosa*), Baltic rush (*Juncus balticus*), Kentucky bluegrass (*Poa pratensis*), Nevada bluegrass (*P. nevadensis*), Junegrass (*Koeleria macrantha*), and field sedge (*Carex praegracilis*) (Fertig 1999). The species is absent from riparian areas and other locations exhibiting saturated soils and dense graminoid or shrub cover (Fertig 1999). Wyoming locations of meadow pussytoes include one occurrence in the northern portion of the Pinedale RMPPA in the Green River Basin, as well as locations in the Sweetwater River Valley and the South Pass area of the southern Wind River Range in Fremont County. In addition, meadow pussytoes is known to occur in south-central and northeastern Idaho (Fertig 1999). Riparian meadows in the Pinedale RMPPA at elevations of 7,200 to 7,900 feet have potential for occurrences of meadow pussytoes (Laster 2002b). Primary threats to the species in Wyoming generally include off-highway vehicles, mining, and water projects (Fertig 1999). Grazing is considered a threat, but to a lesser extent than originally thought. Known populations within managed areas include those from BLM Lander, Pinedale, and Rock Springs Field Offices (Fertig 1999).

- Trelease's Racemose Milkvetch - Trelease's racemose milkvetch is a Wyoming BLM sensitive species as well as a Natural Heritage Network State and trinomial imperiled species. It grows on barren hills and washes (Dorn 1992), although little else is known about this species. The Wyoming Rare Plant Technical Committee (WRPTC) is in the process of compiling information for Trelease's racemose milkvetch. Populations of Trelease's racemose milkvetch are known to occur in Sublette and Uinta Counties (Dorn 1992). Two occurrences are known from the southern portion of the Pinedale RMPPA. Threats to the species are unknown at this time.

- Cedar Rim Thistle - Cedar Rim thistle is a Wyoming endemic perennial herb with Wyoming BLM sensitive status and Natural Heritage Network State and global imperiled status. The species grows on barren slopes, fans, and draws in open areas within Wyoming big sagebrush grasslands at 5,800 to 7,500 feet. It grows on soils typically derived from the Split Rock, White River, Wagon Bed, Wind River, Green River, and Wasatch formations (Fertig 1999). Known populations of Cedar Rim thistle are limited to the Green River Basin in Sublette County, the Beaver Rim area of Fremont County, the Sweetwater River Valley in Carbon County, and highlands on the east side of Flaming Gorge in Sweetwater County (Fertig 1999). In general, pest control measures, including the spraying of herbicides and release of biocontrol insects to control other species of thistle that are invasive, are the main threats to the Cedar Rim thistle. The plant does not appear to be affected by livestock grazing or mineral exploration (Fertig 1999). Management areas with known populations of Cedar Rim thistle include the Pinedale, Rawlins, and Rock Springs Field Offices (Fertig 1999). It is known from three occurrences in the southern portion of the Pinedale RMPPA.

- Large-Fruited Bladderpod - Large-fruited bladderpod is a Wyoming BLM sensitive and Natural Heritage Network global and State imperiled perennial species. It grows in open Gardner's saltbush - squirreltail communities on barren clay hills and flats (Dorn 1992, Fertig 1999). Usually, populations are found on slopes of less than 15 percent on low hills, knolls, or colluvial fans at elevations of 6,800 to 7,700 feet. Soils are usually fine to textured barren clays and shales (Fertig 1999). The large-fruited bladderpod is endemic to an area less than 25 square miles in size on the western rim of the Great Divide Basin and in the Green River Basin near Opal and Ross Butte, Wyoming (Fertig 1999). In general, disturbance from oil and gas mining and exploration is a threat to the species. OHV and wild horse activity are also possible threats (Fertig 1999). Management entities with known populations of large-fruited bladderpod include the BLM Kemmerer, Pinedale, and Rock Springs Field Offices (Fertig 1999). Within the Pinedale RMPPA, large-fruited bladderpod is known from two occurrences on Ross Butte.

- Payson's Bladderpod - Payson's bladderpod is a Forest Service Region 4 sensitive species that is a regional endemic of west-central Wyoming, eastern Idaho, and southwestern Montana. It is found on rocky slopes, ridges, floodplains, and along disturbed roadsides at elevations of 5,500 to 10,600 feet. Within the Pinedale RMPPA, there is one known occurrence of Payson's bladderpod in the north-central portion of the area (Fertig 1999). The pothole region is an area with potential for occurrences of this species (Laster 2002b). Generally, threats to Payson's bladderpod are low, but may include hiking, OHV, ski development, grazing, and mining (Fertig 1999).

- Beaver Rim Phlox - Beaver Rim phlox is a slightly prickly matted plant with large white flowers that was determined in 1988 to be endemic to Wyoming. It is currently classified as Wyoming BLM sensitive with a high conservation priority. It also is ranked by the Natural Heritage Network as a global and State imperiled species. It grows on dry desert hills on sparsely vegetated slopes with sandstone, siltstone, or limestone substrates at elevations of 6,000 to 7,400 feet (Dorn 1992, WRPTC 1994). Populations of Beaver Rim phlox are known to occur in the Green River Basin in Sublette and Lincoln Counties, and in southern Fremont County (Fertig 1999). The Green River Basin populations differ morphologically from those in Fremont County by having short-stalked glandular hairs on the leaves and narrower leaves (Fertig 1999). Beaver Rim Phlox is known to occur in four locations within the Pinedale RMPPA, including one occurrence on Ross Butte. General threats to the Beaver Rim phlox include disturbance from oil and gas development, pipeline construction, and highway construction (Fertig 1999).

- Tufted Twinpod - Tufted twinpod is a Wyoming BLM sensitive perennial forb with Natural Heritage Network global and State imperiled status. It is found on dry, rocky, calcareous knolls and ridges, and shaley hills and clay banks. It occurs in openings within sagebrush grassland at elevations of 6,700 to 7,400 feet in sparsely vegetated cushion plant communities (Dorn 1992, Fertig 1999). Tufted twinpod is an endemic to the southern Overthrust Belt and lower Green River Basin in Lincoln, Sublette, and Uinta Counties in southwest Wyoming (Fertig 1999). Tufted twinpod may be adaptable to disturbed sites and, currently, threats appear minimal (Fertig 1999). The species occurs on lands managed by Fossil Butte National Monument and the BLM Kemmerer, Pinedale, and Rock Springs Field Offices (Fertig 1999). Within the Pinedale RMPPA, it is known from one location in the southern portion of the area.

- Swallen Mountain Ricegrass - Swallen Mountain ricegrass is a perennial bunchgrass with BLM special status in the Rock Springs Field Office, occurring on sandy to gravely limey-clay soils covered with gravel. The Natural Heritage Network ranks the species as State imperiled and globally secure but possibly rare in parts of its range. It is found on rocky slopes, rims, and mesa summits, often associated with sagebrush grasslands at elevations of 6,500 to 7,900 feet (Dorn 1992, Fertig 1999). Swallen Mountain ricegrass is an endemic of east-central Idaho and western Wyoming. Wyoming populations are known only from the western Green River Basin in Lincoln and Sublette Counties (Fertig 1999). In general, populations may be threatened from oil and gas development (Fertig 1999). Populations are known from lands managed by the BLM Kemmerer, Pinedale, and Rock Springs Field Offices, including at least five occurrences throughout the Pinedale RMPPA (Fertig 1999).

- Big Piney Milkvetch - Big Piney milkvetch is listed as a special status species in the Rock Springs and Pinedale field offices. The Natural Heritage Network ranks it as State and globally rare to imperiled. It grows in open areas within sagebrush and cushion plant communities on sandstone, stony clay, badlands, and barren clay slopes and ridges at 6,900 to 7,200 feet (Dorn 1992, Fertig 1999). Big Piney milkvetch is endemic to the Green River Basin in Sublette County. There are reports also placing it in Lincoln County, although these are not confirmed (Fertig 1999). General threats to Big Piney milkvetch include habitat loss and disturbance from vehicles related to natural gas development and exploration activities. Over 30 occurrences are known from a small geographic area within jurisdiction of the BLM Pinedale Field Office and the Bridger–Teton National Forest (Fertig 1999).

3.15.2.2. Other Special Status Species

The remaining species, described below, are ranked by TNC's Natural Heritage Network and listed by the Wyoming Natural Diversity Database. These species lack formal Federal status or protection although they are considered locally or regionally rare or imperiled.

- Sickle Saltbush - Sickle saltbush is a shrub ranked by the Natural Heritage Network as critically imperiled in the State of Wyoming and globally secure. It grows in sagebrush-dominated communities on desert hills, mesas, draws, and gravel benches with sandy to clayey soil (Dorn 1992, Fertig 1999). The known range of sickle saltbush includes southeastern Washington to northeastern California, east to Montana, Utah, and Nevada. In addition to southern portions of the Pinedale RMPPA in Sublette County, Uinta and Sweetwater Counties also contain known populations (Fertig 1999). In general, disturbance from mining exploration may impact some populations of sickle saltbush. Other management entities with known populations include the BLM Kemmerer and Rock Springs Field Offices (Fertig 1999).
- Divergent Wild Buckwheat - Divergent wild buckwheat is ranked by the Natural Heritage Network as State critically imperiled and globally secure. It is a low spreading annual that grows in cushion plant-bunchgrass communities or on the edges of sagebrush grasslands. It prefers barren or semi-barren clay, shale, or sandstone hills and washes at elevations of 6,250 to 7,500 feet (Dorn 1992, Fertig 1999). The distribution of divergent wild buckwheat in Wyoming includes the Great Divide and

Green River Basins in Sublette, Sweetwater, Lincoln, and Uinta Counties (Fertig 1999). Impacts and threats from oil and gas development that could potentially occur in or around populations are unknown (Fertig 1999).

- California Hesperochiron - California hesperochiron is a low-growing perennial herb that is found in moist to dry hills and flats, often in alkaline soils, at elevations of 6,700 to 7,000 feet (Dorn 1992; Fertig 1999). It is ranked critically imperiled in Wyoming and globally secure for most of its range by the Natural Heritage Network. California hesperochiron is distributed along the west coast states, western Montana and Wyoming, and northeastern Utah. The Wyoming distribution includes only the Evanston area in Uinta County and the upper Green River Basin in Sublette County (Fertig 1999). The Pinedale Field Office is the only management agency in Wyoming with the hesperochiron in its range (Fertig 1999). One occurrence is known from the northeast portion of the Pinedale RMPPA. Threats to the species have not been identified.

- Mountain Peppergrass - Mountain peppergrass is ranked by the Natural Heritage Network as critically imperiled in Wyoming, but secure throughout most of its range. It is a perennial herb that is found on meadows, slopes, and disturbed areas, such as roadsides, at elevations of 6,800 to 7,000 feet (Dorn 1992, Fertig 1999). The range of mountain peppergrass is from New Mexico to Utah and Wyoming. Wyoming populations are known from one occurrence the Green River Basin near the Big Piney and Marbleton areas in the Pinedale RMPPA (Fertig 1999). This species may be adapted to disturbance and, therefore, semi-weedy. More research is needed to investigate this possibility. Roadside populations of mountain peppergrass may be susceptible to herbicides or other disturbance (Fertig 1999).

- Juniper Prickly-Pear - Juniper prickly-pear is a clump-forming perennial succulent cactus ranked as critically imperiled in Wyoming and rare to secure throughout its range by the Natural Heritage Network. Habitat includes sandy soils of flats, washes, and hillsides in desert shrub, grasslands, and open grassy flats in southern pinyon-juniper woodlands (Fertig 1999). The Wyoming populations are peripheral, and occur in sandy or gravelly substrates with desert shrub at elevations of 6,120 to 6,950 feet (Fertig 1999). It is found from eastern Utah and southwestern Wyoming to western Colorado, northern Arizona, and New Mexico (Fertig 1999). Wyoming populations are found in sandy desert areas of the Green River Basin in Sublette and Sweetwater Counties, including one occurrence in the east-central portion of the Pinedale RMPPA (Dorn 1992, Fertig 1999). In general, threats to juniper prickly-pear are unknown. It occurs on lands within the Flaming Gorge National Recreation Area, the BLM Kemmerer and Pinedale Field Offices, and the Seedskadee National Wildlife Refuge (Fertig 1999).

- Desert Glandular Phacelia - Desert glandular phacelia is an annual or biennial herb ranked by the Natural Heritage Network as questionably critically imperiled in Wyoming and secure to rare across its range. It usually grows on outcrops of the Green River Formation, but may also occur on Bridger Formation deposits. It grows on semi-barren south or west facing upper slopes in gray clay shale covered by fragmented slate (Fertig 1999). It is associated with cushion plant and bunchgrass communities dominated by turpentine cymopterus (*Cymopterus terebinthinus*), Hooker's sandwort (*Arenaria hookeri*), Goldenweed (*Haplopappus armerioides*), Saline wildrye (*Elymus salinus*), and Indian ricegrass (Fertig 1999). Less often, desert glandular phacelia may occur on chalky, limey-slate outcrops dominated by cushion plants, or in openings within shadscale, green rabbitbrush, and greasewood mixed shrubland (Fertig 1999). Desert glandular phacelia is endemic to the Great Divide Basin and the desert foothills of the Overthrust Belt in southwestern Wyoming in Lincoln, Sweetwater, and Sublette Counties (Fertig 1999). One occurrence is known from the Ross Butte vicinity of the Pinedale RMPPA. General threats to desert glandular phacelia include off-highway vehicle activity and mineral exploration. The BLM Kemmerer, Pinedale, Rawlins, and Rock Springs Field Offices and the Flaming Gorge National Recreation Area have known populations within jurisdictional boundaries (Fertig 1999).

- Hoary Willow - Hoary willow is a ranked by the Natural Heritage Network as globally secure, but imperiled in Wyoming. It is a low-growing shrub that is found on wet to saturated soils in floating mats, bogs, fens, and willow thickets around ponds from the foothills to montane zones at elevations of 6,600 to 9,200 feet (Dorn 1992, Fertig 1999). Wyoming populations of hoary willow are known from the Absaroka, Beartooth, Laramie, and Medicine Bow Ranges, the Yellowstone Plateau, and the upper Green River Basin, possibly within the Pinedale RMPPA (Fertig 1999). Grazing pressures may be a threat on the National Elk Refuge (Fertig 1999).

- Low Spike-Moss - Low spike-moss is a perennial moss-like herb that occurs in saturated moss-covered zones in wet meadows at elevations of 7,700 to 8,000 feet (Dorn 1992, Fertig 1999). It is ranked by the Natural Heritage Network as globally secure, but critically imperiled in Wyoming. Low spike-moss has a large range across North America. In Wyoming, populations are known from the upper Green River Basin in the Pinedale RMPPA, and from the foothills of the Wind River and Teton Ranges in Sublette and Teton Counties (Fertig 1999). General threats to low spike moss populations include development of subdivisions and dam construction (Fertig 1999).

3.15.2.3. Sensitive Areas

3.15.3.3.1. Ross Butte

Ross Butte and Ross Ridge are located along Wyoming Highway 351 in the central portion of the Pinedale RMPPA. The Ross Butte ecosystem in this area provides habitat for many endemic plant species including Big Piney milkvetch, Beaver Rim phlox, large-fruited bladderpod, and desert glandular phacelia (Fertig 1999).

3.15.2.3.2. Pothole Region

The prairie pothole region in the northern portion of the Pinedale RMPPA consists of wetlands ecosystems. No special status species have been specifically identified in this area as of yet, but there is potential for both meadow pussytoes and Payson's bladderpod to occur (Laster 2002b).

3.15.3. NOXIOUS WEEDS

Noxious weeds are defined in Executive Order 13112 as those "species whose introduction does or is likely to cause economic or environmental harm or harm to human health." Noxious weed species, when introduced to an area, are aggressive and often dominate natural communities. They are often able to establish areas following disturbance. As listed in Table 3.15-2, the State of Wyoming has designated 22 weeds as noxious; ten of these are known to be a problem within the Pinedale RMPPA.

Of the species listed in Table 3.15-2, perennial pepperweed, leafy spurge, knapweeds, and Dyer's weed are considered to have the highest management priority within the Pinedale RMPPA. The Sublette County Weed and Pest Agency is concerned with known significant infestations of perennial pepperweed along Muddy Creek north of Big Piney, and the Green River south of Big Piney to LaBarge (Laster 2002a).

Other weed species present within the Pinedale RMPPA, although not officially designated noxious, can be disruptive to native plant communities. These include cheatgrass, halogeton (*Halogeton glomeratus*), and Russian thistle (*Salsola kali*). Of these, halogeton is the most problematic in the Pinedale RMPPA. Weeds are primarily present in areas of disturbance, including along roads, areas of oil and gas development, and in heavily grazed areas. GIS data for weed populations have not been completed for most of the Pinedale RMPPA and, therefore, are not included in this document.

3.16. VISUAL RESOURCES

Visual resources within the Pinedale Field Office are influenced by the different characteristics of the two physiographic provinces in the region: the Wyoming Basin and the Central Rocky Mountains province.

The Wyoming Basin is located in the west-central portion of the State, bounded on the north by the Wind River Range and on the south by the Uinta Range. The province extends east to the Red Desert and west to the foothills of the Wyoming Range. The landform is typically comprised of low mountains, low rolling or flat-topped hills, and isolated hills. The soils are highly erodible and, together with the multi-colored sedimentary bedrock of the region, form the colorful badlands landscape common throughout most of the province. Most of this area is shrub steppe, dominated by sagebrush, greasewood, saltbush, and shadscale, interspersed with areas of shortgrass prairie. The higher elevations are dominated by mountain shrub vegetation, with coniferous forest atop the highest areas.

The Central Rocky Mountains physiographic province extends from the western edge of Wyoming south into Colorado, north to the Montana/Wyoming border, and west into Idaho. The province is characterized by high, rugged, glaciated mountains rising to elevations of up to 13,000 feet above sea level. Glaciation has left broad flat valleys between mountain ranges. Deep, V-shaped drainages with steep, rocky slopes are common. Elevation determines the dominant vegetation: the areas of highest elevation support alpine tundra. The subalpine zone is dominated by Engelmann spruce and subalpine fir, with ponderosa pine and Douglas fir in the montane zone below that. Fire can change forests in either of those zones to lodgepole pine or aspen. Grass and sagebrush occur under open pine forests that grade downslope into grasslands, woodlands, or shrub steppe.

3.16.1. SCENIC VIEWS

Within the Pinedale RMPPA, the diversity of topography and landforms exhibited by these two distinctly different topographic zones creates an extraordinary variety of visual contrasts and scenic beauty. The Pinedale RMPPA contains a major river system and watershed, the Upper Green River, and borders the slopes of several major mountain ranges: the Gros Ventre Range to the north, the Wind River Range to the east, and the Wyoming Range to the west.

Numerous areas within the Pinedale RMPPA exhibiting high degrees of scenic quality are easily accessible to tourists and other recreationists. Some examples of high quality scenic views and viewsheds within the area include the following:

- The Upper Green River is a highly scenic area, and river floaters can enjoy scenic and wildlife views along both sides of the river for approximately 10 to 12 miles
- In the vicinity of the town of Pinedale, the Pinedale Front is an area that includes very scenic foothill country adjoining the Bridger National Forest. It includes the lands adjacent to the Fremont, Soda, Willow, and New Fork Lakes
- Scab Creek is an area of extraordinary scenic views, and contains some of the best scenery of BLM-managed lands within the State. This area is typified by steep, rugged rock outcrops, aspen, lodgepole pine, and Douglas fir stands interspersed with grassy meadows, small lakes, and streams
- The stretch of road along Highway 352 in the vicinity of the town of Cora encompasses the majority of the land between the town of Pinedale and the Warren Bridge Campground. The upper New Fork River crosses this highway, and this area provides excellent views of the Wind River Range to the north and east
- The Lake Mountain-Miller Mountain drive, north of LeBarge Creek, provides one of the most scenic drives along the Wyoming Range. The area consists of steep canyons, scenic rock outcrops along narrow canyon bottoms, and clear streams lined with aspens and willows.

3.16.2. VISIBILITY

The Pinedale RMPPA is essentially rural in character, and because it lacks a major source of air pollution, the Wyoming Air Quality Division has designated the Pinedale RMPPA as an air pollution attainment area, which meets all of the Environmental Protection Agency's (EPA's) national pollution and ambient air quality standards. The National Park Service (NPS) has designated Yellowstone National Park and Grand Teton National Park as Prevention of Significant Deterioration (PSD) Class I areas. PSD Class I areas receive the highest degree of protection from air pollution within the Park's viewshed, and allow only small amounts of particulate, sulfur dioxide (SO_2), and NO_2 air pollutants within the Park's viewshed (NPS 2002). Thus, the air quality is generally excellent, and pollutants do not obscure visibility.

3.16.3. VISUAL RESOURCE MANAGEMENT SYSTEM

The Pinedale RMPPA has been inventoried using the BLM Visual Resource Management (VRM) Classification System. Using the VRM system, the Pinedale RMPPA was classified into four BLM visual management classifications (I through IV), based on scenic quality, visual sensitivity levels, and viewer distance zones. No Class V areas were identified. Each VRM classification has a management objective, and these objectives are described below:

- **Class I** – The objective of this class is to preserve the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activities. The level of change to the characteristic landscape should be very low and should not attract attention
- **Class II** – The objective of this class is to retain the existing character of the landscape. The level of change to the landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes to the landscape must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape
- **Class III** – The objective of this class is to partially retain the existing character of the landscape. The level of change to the landscape should be moderate. Management activities may attract the attention of the casual observer, but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape
- **Class IV** – The objective of this class is to provide for management activities that require major modifications to the existing character of the landscape. The level of change to the landscape can be high. The management activities may dominate the view and may be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repetition of the basic visual elements of form, line, color, and texture (BLM 1986).

The established VRM classes for the Pinedale RMPPA are depicted in Figure 3.16-1. The acreages for each VRM class within the Pinedale RMPPA are depicted in Table 3.16-1, Visual Resource Management Classifications and Acreage (BLM 1988).

The present objectives of VRM within the Pinedale RMPPA are to maintain or improve the scenic quality of the landscape throughout the Pinedale RMPPA, and to ensure that all visual intrusions or impacts are designed or mitigated so that the changes to scenic quality do not exceed the established VRM class objectives.

Currently, the VRM classification for the South LaBarge and Fontenelle Creek area that defines the southern boundary of the Pinedale RMPPA, and the northern boundary of the Kemmerer Field Office, are not consistent. The north side of Fontenelle Creek, from Mammoth Hollow to the Highway 189 corridor, is classified as VRM Class IV. On the south side of Fontenelle Creek (Kemmerer side), the landscape has been classified as VRM Class II and Class IV (Hudson 2002, Mierzejeweski 2002).

The VRM classification for the areas that border the Rock Springs and Pinedale Field Offices are not consistent. The Highway 191 travel corridor designated as Class III in the Pinedale RMPPA becomes Class IV in the Rock Springs area; a Class IV area in the vicinity of Muddy Creek (west of Irish Canyon) is Class V in the Rock Springs area; and the Highway 189 travel corridor is designated as Class IV in the Pinedale RMPPA and as Class III in the Rock Springs area (Moore 2002).

3.16.4. VISUAL RESOURCE TRENDS

3.16.4.1. OHV Use

The existing Pinedale RMP describes those areas that have been designated for OHV use. OHV use is not yet highly popular in the Pinedale RMPPA; however, an increase in unmanaged, unmonitored OHV use within the area for both recreation and access to the surrounding Forest Service-managed lands in the Bridger-Teton National Forest are creating direct, negative visual impacts throughout the Pinedale RMPPA. Visual impacts are being produced by OHVs cutting trails and roads, and accelerating soil erosion.

Areas of potential conflict between VRM class objectives and OHV use include the following:

- The Red Canyon area (in the vicinity of Bald Mountain on the eastern slope of the Wyoming Range) where an increasing number of roads and trails are causing a degradation of visual quality
- The desert area between Highways 189 and 353 and south of the New Fork, where OHV use is conflicting with VRM objectives
- Scattered areas along the Wind River Front Range from Boulder Lake southeast to Irish Canyon
- Scattered areas along the Wind River Front Range from Boulder Lake northwest to north of Willow Lake

- The Potholes Area, northwest of New Fork Lake (Hudson 2002).

Under the present management plan, OHV-produced visual degradation caused by the production of fugitive dust within the Pinedale RMPPA is localized, but long-term. Visual degradation from trail creation is extensive and long-term.

3.16.4.2. Oil and Gas Development

The rapid increase of petroleum and natural gas exploration and extraction in the Pinedale RMPPA is creating direct, negative visual impacts within the Pinedale RMPPA. Currently, visual mitigation of this activity is preventing oil and gas development activities from exceeding the established VRM objectives within these areas.

The trend toward continued expansion of oil and gas development within the Pinedale RMPPA is creating areas of potential conflict between this activity and the established VRM class objectives. Those areas identified as areas of potential conflict include: 1) the Mesa area (south and west of Pinedale); 2) the Warren Bridge/Upper Green River SRMA; and 3) the historic Oregon Trail. Other areas of high visual quality (and potential future conflict) include: 1) all higher elevation areas; 2) the Highway 191 travel corridor; 3) the Pinedale Anticline area; 4) the Wind River Front; and 5) all WSAs.

3.16.4.3. Visual Sensitivity

As increasing numbers of sightseers and those seeking various types of recreational opportunities pass through the Pinedale RMPPA, a heightened sense of scenic values and of the existing scenic quality is occurring. A trend is developing in which county residents and those traveling through the area are becoming more aware of and more sensitive to the scenic quality and scenic values within the Pinedale RMPPA.

3.17. WATER QUALITY AND WATERSHED

Water resources include both surface and subsurface sources. Hydrological conditions affect riparian, wildlife, and fishery resources, as well as cause economic consequences to man-made structures and water supply.

This section focuses primarily on surface watersheds, as these are the component of the hydrologic cycle most vulnerable to management choices. Groundwater has remained largely undeveloped in the Pinedale RMPPA and is not as likely to be impacted by management decisions, although impacts may occur through oil and gas drilling activities.

In general, this section focuses on the quantity of water available in the Pinedale RMPPA, current uses of water, water quality, and the regulatory framework surrounding water use.

3.17.1. SURFACE WATER

3.17.1.1. Watersheds

The Pinedale RMPPA lies within portions of four separate watersheds located within the Upper Colorado hydrologic region (Region 14), as well as just touching the Pacific Northwest hydrologic region (Region 17). Within the Upper Colorado region, the bulk of the Pinedale RMPPA lies within the Upper Green River and New Fork River watersheds, both part of the Green River drainage. Very small portions of the Pinedale RMPPA lie within the Big Sandy and Slate watersheds, also part of the Green River drainage. Watershed boundaries are shown on Figure 3.17-1.

Watersheds are defined by an 8-digit Hydrologic Unit Code (HUC) assigned by the U.S. Geologic Survey (USGS). Four of the watersheds in the Lower Green drainage have also undergone further detailed delineation into sub-watersheds, designated by the 10- and 12-digit HUCs.

Surface water in the RMP area is greatly influenced by topography and geology. The topography of the Pinedale RMPPA is characterized by a high plateau, dissected by the Green River and its tributaries, bounded to the north and east by the Wind River Range and to the west by the Wyoming Range and Absoroka Ridges. Glacial deposition features have created numerous lakes on the slopes of the Wind River Range; however, most of these lakes lie just outside of the Pinedale RMPPA boundary (Woolley 1930).

The Green River, the major drainage in the Pinedale RMPPA, arises on the north slope of the Wind River Range before turning south and entering the planning area. The Green River runs through an alluvial valley the entire length of the Pinedale RMPPA to the southern boundary of the planning area at Fontenelle Reservoir. The major tributary to the Green River is the New Fork River, whose tributaries arise from the glacial lakes on the western face of the Wind River Range. The New Fork River follows its own alluvial valley through a rolling plateau area known as The Mesa (which includes the Pinedale Anticline oil and gas field), until it joins the Green River in the vicinity of Big Piney. The land downstream of the New Fork River and east of the Green River, consists of an arid, slightly rolling plateau known as the Little Colorado Desert (Woolley 1930).

Tributaries that drain the area west of the Green River include Piney Creek, LaBarge Creek, and Fontenelle Creek, all of which arise from the east face of the Absoroka Ridges and flow through bluffs and buttes formed from a highly dissected plateau.

3.17.1.2. Surface Water Supply and Use

Water in the Pinedale RMPPA is used for agricultural, municipal, industrial (primarily oil and gas production), and recreation purposes. Surface water is stored in several large and small reservoirs. Fontenelle Reservoir is the largest (345,000 acre-feet of storage). Other reservoirs include McNinch Number 1 Reservoir (1,100 acre-feet), McNinch Number 2 Reservoir (200 acre-feet), and Sixtyseven Reservoir (5,000 acre-feet).

Irrigation (primarily for hay fields) is the greatest water user in the basin, with approximately 186,000 irrigated acres accounting for 98 percent of all use, almost all from surface water diversions (States West 2001). Major industrial users of surface water elsewhere in the Green River Basin, though not in the Pinedale RMPPA, include soda ash production, power generation, and chemical manufacturing; however, no major surface water industrial users are located in the Pinedale RMPPA. Oil and gas leases account for some groundwater use in the basin, although the amount is not known (States West 2001).

Municipal and domestic supply account for less than 2 percent of the total water use in the Pinedale RMPPA. Only four municipal supply systems are located in the Pinedale RMPPA. Pinedale and LaBarge rely on surface water, while Marbleton and Big Piney rely on groundwater wells for their water supply. Domestic supply wells located in rural areas beyond the reach of the municipal supply systems likely account for as much water use, or more, than the major towns.

3.17.1.3. Surface Water Quality

Surface water quality problems are detailed in Wyoming's 303(d) list of impaired waters, required under the *Clean Water Act*. No streams or lakes within the Pinedale RMPPA are included on the 303(d) list (Wyoming Department of Environmental Quality [DEQ] 2002). This reflects the generally good quality of surface water in the Pinedale RMPPA. Total dissolved solids (TDS) for all of the Green River drainage above Fontenelle Reservoir are on average less than 500 milligrams per liter (mg/L), have an acceptable pH range of 6.5 to 9.0, and have temperatures ranging from 0 degrees Celsius (°C) in the winter to 25 °C in the summer. Total phosphorous concentrations can reach levels that cause nuisance algae and aquatic plant blooms in later summer or early fall (States West 2001).

Currently there is an inter-basin diversion of water from LaBarge Creek to Muddy Creek. The water is used for irrigation, but the disruption to the natural drainage tends to cause high sediment yield. This diversion is a major source of sediment for Muddy Creek, although it is probably not a large source of sediment for the drainage as a whole (Doncaster 2002a).

As part of the Upper Colorado River system, the Pinedale RMPPA is subject to the Colorado *River Salinity Control Act*. As salinity is generally not a concern in the Pinedale RMPPA, no salinity control projects are being undertaken at this time (Doncaster 2002b).

3.17.1.4. Water Rights

Surface water is allocated through water rights as established by the Wyoming constitution under the doctrine of prior appropriation, or "first in time, first in right." However, water rights are considered property rights that are appurtenant to the land, and can only be transferred in use or location after review by the State Engineer's Office or the Board of Control. This system makes it very difficult to track water rights associated with one entity, such as the BLM.

While the State Engineers' Office has a database of surface water rights, each water right is identified by location and the name of the original filing party. Subsequent changes in land ownership are not tracked or accounted for in the database. Thus, a search of the database for all surface water rights held by BLM would return any surface water rights originally filed by BLM, but would not indicate whether BLM still held that right (Bratton 2002).

No Federal reserved rights exist within the Pinedale RMPPA. All BLM water rights are established through the Wyoming State Engineers' Office (Doncaster 2002a).

Under Wyoming law, water rights may be established for instream flows. These rights are filed and granted on unappropriated water, either natural flow or as releases from reservoirs, to maintain and improve fisheries. Nine instream flow rights have been filed by the State of Wyoming within or immediately adjacent to the Pinedale RMPPA.

In addition to instream flow rights, the Wyoming Game and Fish Department has established recommended minimum maintenance flows on many streams in the area, which are viewed as necessary to support game fish populations in the late season, low-flow months.

3.17.1.5. Floodplains

The 100-year floodplain for major drainages is depicted on Figure 3.17-2. Approximately 150,044 acres of the Pinedale RMPPA occur within the 100-year floodplain. The status of the functioning condition of riparian vegetation along major waterways has been documented; condition of the floodplain and stability of stream banks still needs to be surveyed.

3.17.1.7. Overall Watershed Health

Watershed conditions throughout the higher elevations are generally good, due to a higher degree of streamside vegetation and coarser, more stable substrate. Furthermore, streams in this portion of the Pinedale RMPPA are largely perennial in nature, with high-frequency, low-magnitude flow events that are less likely to initiate channel degradation.

Poorer watershed condition is exhibited on the intermittent and ephemeral streams at lower elevations, due to lack of streambank vegetation, flashiness of runoff (lower frequency, high-magnitude floods), and finer-grained substrate more vulnerable to erosion. These areas generally are encompassed by the areas in and near the Little Colorado Desert in the southern portion of the Pinedale RMPPA.

3.17.2. GROUNDWATER

3.17.2.1. Groundwater Supply and Use

There are eight major aquifer systems identified in the Pinedale RMPPA, but all have remained largely undeveloped as water supplies. The majority of the bedrock surface exposures in the area are Cretaceous and Tertiary age rocks, which include several aquifer systems, including the Frontier aquifer (western part of the basin), the Mesa Verde aquifer system, and the Tertiary aquifer system. The Tertiary aquifer system includes a number of water-bearing formations, including the Green River, Wasatch, Battle Springs, and Fort Union Formations. The majority of the groundwater use in the Pinedale RMPPA derives water from the Tertiary aquifer system or the Quaternary sands and gravels associated with the major river courses.

The main uses of groundwater in the Pinedale RMPPA are for municipal and industrial purposes. Industrial use of groundwater is primarily for oil and gas leases in the Pinedale RMPPA.

3.17.2.2. Groundwater Quality

Groundwater quality varies throughout the Pinedale RMPPA based on location and geologic unit. In general, groundwater at the periphery of the Pinedale RMPPA is nearer to high recharge areas in the bounding mountain ranges and generally has a total dissolved solids (TDS) concentration less than 500 mg/L. However, groundwater elsewhere in the Pinedale RMPPA can exceed TDS concentrations of 3,000 mg/L. Occasional groundwater quality problems are caused by iron, manganese, fluoride, and nitrate (Lowham 1985).

3.18. WILD HORSES

Wild horses were removed from the Pinedale RMPPA in the early 1990s (Powell 2002). The decision to remove the horses was a result of the 1988 RMP process due to documented conflicts for water and forage between the wild horse and other resource use (BLM 1988). The two herd management areas, Desert Herd and LaBarge Herd, still exist but are not managed for wild horses at this time. The removal of the wild horse herds has resulted in decreased conflicts for forage and water. The livestock distribution has been improved due to the availability of water sources to cattle instead of wild horses.

A small wild horse group eluded capture in the 1990s and remains in the Desert Herd management area, mainly in the South Desert, Sand Draw, Blue Rim, and Alkali Draw Allotments. Currently, the herd number is low, and conflicts with the resource use in that area are minimal. However, in accordance with the 1988 RMP, the goal is to remove all the wild horses in the future.

3.19. WILDLIFE AND FISHERIES

The diverse natural communities throughout the Pinedale RMPPA support a wide variety of game and non-game wildlife and fish species including several special status species. This section presents the current known status, distribution, and natural history as it pertains to management of game, non-game, and special status wildlife and fish species within the Pinedale RMPPA. Although many species occupy the Pinedale RMPPA all year, some species are only present on a seasonal basis.

Hunting and fishing activities have historically been one of the highest income generating industries in the region and thus game species have generally received the most management emphasis (BLM 1986). Information on population trends, if known, is provided herein for game species to assist in evaluating current management and habitat conditions. For non-game species with special conservation status, agency listing and current threats to the population are presented. Listing status is given for the BLM, U.S. Fish and Wildlife Service (USFWS), Forest Service, and the Wyoming Game and Fish Department (WGFD).

3.19.1. TERRESTRIAL WILDLIFE

3.19.1.1. Game Species

3.19.1.1.1. Big Game

BLM administered lands in the Pinedale RMPPA provide habitat for pronghorn antelope (*Antilocapra americana*), mule deer (*Odocoileus hemionus*), elk (*Cervis elaphus*), moose (*Alces alces*), bighorn sheep (*Ovis canadensis*), black bear (*Ursus americanus*), and mountain lion (*Felis concolor*). Furthermore, these lands provide the majority of crucial winter habitat for pronghorn antelope, mule deer, and elk populations found in the Upper Green River Basin. Crucial winter habitat consists of those areas where most members of a population are forced to subsist during maximum snow cover each year. Data on big game populations are compiled by the WGFD on a herd unit / hunt area basis. Population estimates, trend, and objectives for big game species in the Pinedale RMPPA are shown in Table 3.19-1. Herd unit and hunt area designations are different for each species and do not conform to the Pinedale RMPPA boundaries. Therefore, the population parameters shown in Table 3.19-1 represent a larger area than the Pinedale RMPPA. Table 3.19-2 shows the habitat status for big game species on BLM-managed land within the Pinedale RMPPA. Hunting statistics for the 2000 season are shown in Table 3.19-3.

Pronghorn

Pronghorn antelope populations in Wyoming have fluctuated drastically over the years (BLM 1986). Most major population declines are attributed to severe winter conditions, which have raised mortality levels to nearly 40 to 50 percent in some years. Currently, pronghorn can be found commonly throughout most of the Pinedale RMPPA. The Pinedale RMPPA includes the Sublette herd unit. The Sublette herd population appears to be stable at an estimated 47,700 post hunting season animals in 2001, which is close to the WGFD population objective of 48,000. The Pinedale RMPPA includes hunt areas 86 through 90. The estimated harvest for pronghorn in the 2000 season was 2,920. The 2002 quota combined for the five hunt areas is 1,970.

Pronghorn seasonal use areas are shown on Figure 3.19-1. Pronghorns are predominantly associated with low, rolling terrain supporting open grassland and sagebrush communities. Although pronghorns are associated with grassland ranges, grasses average less than 10 percent of their diets (Mackie et al. 2002). During summer months and in drier regions, forbs constitute the majority of the pronghorn diet. Pronghorns prefer a low vegetation structure averaging 15 to 24 inches in height with at least 10 to 30 percent forbs and 5 to 20 percent browse. Summer habitat is present throughout the Pinedale RMPPA, although areas with the greatest forb diversity and plant succulence occur on the higher open benches. The ratio of does to fawns has consistently been higher on these ranges than on the drier summer habitat to the south (BLM 1986). Natural gas and oil development since 1998 in the southeast portion of the Pinedale RMPPA has impacted pronghorn summer habitat resulting in short-term disturbance of approximately 2,250 acres and long-term disturbance of approximately 1,110 acres. Much of the big sagebrush habitat in this section of the Pinedale RMPPA has reached an even-aged, old growth stage. Therefore, short-term disturbances from this development are providing some benefit to pronghorn summer range by creating openings in the sagebrush for new forb growth.

The degree of browse, especially sagebrush, appears to be the limiting factor for pronghorn winter range when heavy snow covers low growing forbs. Salt desert shrubs are also an important forage species in some areas (BLM 1986). Under severe winter conditions, pronghorns are further confined to limited crucial range generally occurring on lower south-southwest facing slopes that remain open during adverse conditions (BLM 1986). Crucial winter and yearlong habitat has been designated immediately west of Fontenelle Reservoir and along other portions of the Green River north to Cottonwood Creek. Additional crucial winter habitat has also been designated along the New Fork River between the Green River and the Town of Boulder. These limited crucial areas are extremely important for pronghorn survival in the Pinedale RMPPA.

Pronghorn require readily accessible water, which may be a limiting factor on the summer range (USDA 2002). Dominant male pronghorn hold widely spaced territories on the summer range (Kitchen 1974). Although the amount of water needed varies inversely with the quantity and succulence of green vegetation consumed, male territories usually contain some open water (Hopkins 2002). Pronghorn are normally found within 3 miles (6 km) of open water and some otherwise suitable habitat may remain unoccupied when access to water is lacking (USDA 2002). Adequate water in the Pinedale RMPPA is normally available to pronghorns in reservoirs and wells during the grazing season. During dry years, limited water is available in the fall when reservoirs are dry and wells are deactivated.

Pronghorns in Wyoming normally migrate between summer and winter habitat. The timing of annual migrations varies with the yearly climatic conditions but is usually underway by October, with pronghorns typically remaining on the winter range until April (BLM 1986). Pronghorn herds in the Pinedale RMPPA are known to migrate up to 150 miles between summer ranges in the Jackson Hole Valley and wintering areas along the Green River near Seedskadee National Wildlife Refuge, which is several miles south of the Pinedale RMPPA (WYDOT 2002). The Sublette herd travels through active oil and gas fields and studies are currently underway in cooperation with WGFD to monitor the effects of this development on migration patterns. To this date, pronghorn appear to be adapting to the disturbance and general movements of the herd have not been greatly affected. Unlike deer or elk, pronghorn will not typically jump fences and fences that are improperly located or designed will impede their movements and could have significant consequences for the herd. All new or reconstructed fences have been built in accordance with 1989 BLM Manual H-1741-1, which mandates a minimum height between the bottom fence wire and the ground. With the exception of highway fences, there are no known major problem fences in the Pinedale RMPPA. When problem fences are discovered, however, they are improved to avoid pronghorn mortality. Some problems arise during snow buildup on the southern boundary fences when the area between the bottom wire and the ground becomes blocked by crusted snow. Gates on these fences are opened during severe snow years to alleviate this problem.

Livestock grazing occurs on portions of the pronghorn summer range. Cattle and pronghorn have very little dietary overlap and, therefore, some cattle grazing is compatible with pronghorn habitat. However, heavy cattle stocking may convert shrub-grassland habitat into shrubland making it less useful for pronghorn summer range. The diets of domestic sheep, however, have considerable overlap with the pronghorn diet and they often out-compete pronghorn for forage (USDA 2002). There are currently no known problems with livestock grazing and pronghorn habitat.

Mule Deer

Mule deer are a common resident of the Pinedale RMPPA. Deer populations in the Pinedale RMPPA can fluctuate drastically with major declines occurring during severe winter conditions (BLM 1986). The Pinedale RMPPA includes the Sublette and Wyoming Range herd units. Deer populations declined after the winter of 1992-1993 possibly because of harvest, winter conditions, summer drought, and diminished vigor and decadence of shrubs on the winter range (McWhirter 1994, 1998). Both herd unit populations have increased from previous years, however, and the Sublette herd unit is currently exceeding management objectives. The Pinedale RMPPA includes deer hunt areas 138 through 143, 154, and 162. The estimated harvest for deer in 2000 was 1,760. The hunting season quotas for 2002 are unlimited for hunt areas 138 through 140, 142, 143, and 154. However, for hunt areas 141 and 162, there is limited quota of 175 each.

Mule deer in the Pinedale RMPPA are migratory and few animals winter north of Pinedale (BLM 1986). Mule deer usually move onto the winter range during November and remain there until mid-April or May. Extensive migrations of over 160 km are known and seasonal areas used by adults may be traditional (Clark and Stromberg 1987). Migratory pathways may take mule deer into active oil and gas fields. Studies by WGFD have been underway since 1998 to monitor migratory pathways, winter range use, and survival rates of mule deer (USGS 1999).

Mule deer seasonal use areas within the Pinedale RMPPA are shown on Figure 3.19-2. Mule deer are found in a wide variety of habitats from the plains to alpine regions. They prefer rocky, broken terrain at high elevations and rugged prairie habitat at lower elevations. Mule deer usually occupy open forested regions or brushy stream bottoms and shrublands. Adequate cover is important on winter range for mule deer (USDA 2002). Deer are primarily browsers and big sagebrush is the key browse species year-round in the Pinedale RMPPA (BLM 1986). On the winter ranges in the southwest portion of the Pinedale RMPPA, big sagebrush may be supplemented by limited quantities of mountain mahogany (*Cercocarpus* spp.), rabbitbrush (*Chrysothamnus* spp.), bitterbrush (*Purshia tridentata*), and serviceberry (*Amelanchier* spp.).

Seasonal and yearlong habitat for mule deer is found throughout most of the Pinedale RMPPA except the southeast and west-central regions. Lands administered by the BLM in the Pinedale RMPPA provide over 100,000 acres of summer habitat for mule deer (BLM 1986). This area includes the foothill aspen/conifer complex found on the east slope of the Wyoming Range. Due to a lack of fire, conifer encroachment is reducing the quality of foothill areas as summer range for mule deer. Winter range, however, is considered the limiting factor for mule deer in the region (BLM 1986). Even with available sagebrush, mule deer are on a negative energy budget from the start of cold weather until spring. Animal condition in late fall is the primary factor of winter survival. Those animals with adequate energy (fat) reserves are in a more favorable position to survive the winter (BLM 1986). Crucial winter and yearlong habitat exists along the Green River between Fontenelle Creek and the confluence with the New Fork River. Additional areas of crucial winter range occur along North Piney Creek and along waterways in the east-central portion of the Pinedale RMPPA. These areas are usually in lower elevations with south-southwest facing slopes or on mesa tops where the snow is blown clear.

Elk

Elk have occupied the Pinedale RMPPA since prehistoric times and populations have varied greatly based on habitat quality and mortality levels. Populations were perceived to be at low levels between the early 1800s and mid-1900s, most likely due to a lack of game laws, restricted migration, and competition for winter forage with livestock. Expanding hay ranches and livestock grazing resulted in inadequate natural winter range to support long-term viable elk populations (BLM 1986). Therefore, winter feeding grounds were incorporated into the Pinedale RMPPA during the late 1940s and early 1950s to provide supplemental food for elk that migrate to the area for the winter and reduce elk depredation of rancher's hay. Currently, ten winter feeding grounds in the Pinedale RMPPA are administered by the WGFD through a Memorandum of Understanding with the BLM (Figure 3.19-3). Elk populations rebounded during the latter half of the 20th Century and the most recent population estimate for the five herd units occupying the Pinedale RMPPA combined was almost 8,900 individuals. These populations appear to be stable and are currently in line with WFGD population objectives. The Pinedale RMPPA includes elk hunt areas 87, and 92 through 98. In the 2000 hunting season, an estimated 3,405 individuals were harvested. The 2002 quotas are general and vary between early and late seasons.

Elk occupy a variety of habitats from lower shrublands to high alpine meadows using dense coniferous forests for shelter (Clark and Stromberg 1987). The elk in the Pinedale RMPPA are migratory and most migrate to the Bridger-Teton National Forest in the summer. However, some elk remain on the higher elevation BLM-administered lands throughout the summer in areas where cover is adequate and disturbing activities are minimal (BLM 1985). Elk seasonal distributions within the Pinedale RMPPA are shown on Figure 3.19-3. Elk diets consists mostly of grasses and forbs with grasses being the dominant forage in spring and forbs being the dominant forage in summer months (Clark and Stromberg 1987). Shrubs are consumed year-round but are especially important on the winter range when forbs and grasses are less accessible.

Cover is a crucial component of elk habitat as it provides protection from predators and reduces energy expenditures during the winter stress period (BLM 1985). Forest stands of varying ages with an expansive shrub community that can hide 90 percent of a standing elk at a distance of 200 feet or less provide the necessary security cover (USDA 1999). Areas of sufficient cover for an elk have a canopy cover of over 40 percent (BLM 1986). Therefore, elk populations are highly susceptible to excessive or poorly-timed logging or energy developments (Clark and Stromberg 1987). Optimal security cover should also be inaccessible to motorized vehicles and suffer little human disturbance (BLM 1986). This is particularly important on winter ranges when human disturbances may cause elk to expend more energy, ultimately reducing their chances for survival. Studies of elk behavior indicate that elk may avoid roads, particularly in areas with little or no cover. Areas of interspersed woodland cover and open meadows with few roads appear to be critical in providing both escape cover and necessary herbaceous forage (USDA 1999).

Within the Pinedale RMPPA, elk primarily occur west of the Green River and along the northeastern boundary. BLM-administered lands provide less cover for elk and have a higher degree of road access than the adjacent Forest Service lands, but are important because the long stringers (continuous strands) of cover along ridges allow elk access to forage and winter range (BLM 1986). High country areas along the forest boundary (aspen-conifer associations) support considerable spring/fall and some summer elk use. These areas are also used for calving. In addition to the managed feeding grounds, several natural elk winter ranges occur within the Pinedale RMPPA. Crucial winter habitat is found along the west and northeast borders along wind blown ridges and south-southwest facing slopes. Elk in the Miller Mountain-Fort Hill Deadline Ridge areas have not required supplemental feeding due to an abundance of natural forage.

Moose

Very little evidence exists regarding the occurrence of moose in the Pinedale RMPPA before the early 1900s. By the 1920s, however, moose populations began to grow and expand along the Wind River and Wyoming Mountains (BLM 1985). Today, moose can be found in the Pinedale RMPPA along willow covered riparian communities and on the aspen-conifer foothills throughout the year (BLM 1985). Impacts that may affect moose include degradation of riparian vegetation, vegetation from erosion, degeneration of aspen, increased winter recreation, and energy developments (Lockwood 1994). The Pinedale RMPPA supports the Sublette herd unit with an estimated 2001 post hunting season population of 2,400 individuals. This population appears to be stable and is currently in line with WGFD population objectives. The Pinedale RMPPA includes moose hunt areas 4, 5, 25, and 26. The estimated moose harvest for the 2000 hunting season was 215. The 2002 quota for the 4 hunt areas combined is 400.

Moose are generalist browsers and are known to eat willow, bitterbrush, Douglas fir, serviceberry, subalpine fir, mountain ash, white-barked pine, cottonwoods, sedges, rushes, and blue spruce (BLM 1985, Clark and Stromberg 1987). Several species of willow and aspen are the most important winter browse plants (BLM 1985). Moose prefer areas with adequate security cover year-round, but cover becomes critical on winter range when escaping extreme snow depths and during calving (USDA 2002).

Moose are normally solitary animals and generally move short distances between seasonal ranges. Winter populations are considerably larger in the Pinedale RMPPA than summer populations as moose summering at higher elevations on the Bridger-Teton National Forest migrate to the lower stream bottoms to escape extreme snow depths (BLM 1985). Moose seasonal distributions within the area are shown in Figure 3.19-4. Summer range for moose is confined primarily to the higher, timbered portions of the Pinedale RMPPA, especially the upland meadows and aspen-conifer cover types west of Highway 189 and along the northeast boundary. Crucial winter and yearlong habitat is found along most major drainages throughout the Pinedale RMPPA. Other winter range and yearlong areas occur along and between Middle and North Piney Creeks. Some intermediate areas between the stream bottoms and higher summer range are utilized during spring and fall.

Many portions of aspen-conifer moose habitat are in an old-growth stage and undergoing continued encroachment of conifer, making these areas less valuable as moose habitat. The BLM, USFWS, and the Natural Resource Conservation Service (NCRS) have developed a procedure to measure the health of riparian and wetland communities, based on the functionality of physical processes referred to as Proper Functioning Condition.

Assessments have been completed for stream and river systems on BLM-managed lands within the Pinedale RMPPA. Of the approximately 272 miles of riparian areas analyzed within the Pinedale RMPPA, 63 percent have been rated as in Proper Functioning Condition (BLM 2002). Approximately 36 percent have been rated as Functional-At Risk and less than one percent was rated as Nonfunctional.

Bighorn Sheep

Bighorn sheep inhabit semi-open, precipitous terrain with rocky slopes, ridges, and cliffs or rugged canyons. Although bighorn sheep historically utilized winter range in lower foothill sagebrush and prairie regions, they are currently restricted to remote mountain regions (Clark and Stromberg 1987). No bighorn sheep are known to occur within the Pinedale RMPPA. The Darby Mountain sheep herd can be found in the Wyoming Range just west of the Pinedale RMPPA and the Whiskey Mountain sheep herd occurs in the Wind River Range to the east. The Darby Mountain population experienced a population crash in 1997 and 1998 and numbers are still far below the WGFD population objective of 150 individuals. There has been no hunting of this herd in recent years. The Whiskey Mountain herd appears to be stable at approximately 900 individuals, but is still below the population objective of 1,300. The Pinedale RMPPA includes bighorn sheep hunt area 8, which is occupied by the Whiskey Mountain sheep herd. The estimated sheep harvest in 2000 was 8 individuals. The 2002 quota for hunt area 8 is 4 rams.

Forage and escape terrain are the most important components of bighorn sheep habitat. Bighorn sheep tend to forage in open areas with low vegetation such as grasslands and shrublands and they tend to avoid foraging on mild slopes with shrub or canopy cover in excess of 25 percent and shrubs 2 feet (60 cm) or higher (USDA 2002). Cliffs, rock rims, rock outcroppings, and bluffs with sparse cover of trees or shrubs typify escape habitat, which provides both thermal and hiding cover. Escape terrain is especially important on lambing range.

Bighorn sheep have distinct winter and summer ranges and movements are triggered by snow accumulation (USDA 2002). They normally travel to south-southwest facing slopes for winter range, while preferred lambing range is on the most precipitous, inaccessible cliffs near forage, and generally has a dry, southern exposure. Summer range normally consists of grassland meadows and plateaus above timberline and north facing slopes are preferred during later summer months.

Black Bear

Little information is available on black bear populations and dispersal patterns in the Pinedale RMPPA. All existing information is derived from harvested individuals. These specimens assist in monitoring health and sex ratios, but do not offer enough data for an accurate population estimate. According to WGFD, harvest information indicates that populations of black bear are healthy. The Pinedale RMPPA includes bear hunt areas 11, 14, 15, and 19. The estimated black bear harvest during the 2000 hunting season was 23 individuals. The 2002 quota for the four hunt areas combined is 63.

Black bear in Wyoming are mostly associated with roadless areas in mountains with thick understory vegetation (Clark and Stromberg 1987). The availability of food and den sites are critical components of black bear habitat. Except for female/cub groups, black bears are normally solitary animals. Black bear home ranges vary from 5 to 200 sq. km based on habitat quality. These bears mainly feed on grasses, forbs, buds, berries, and roots supplemented with insects and carrion. They have been known to hunt elk calves, but are not normally active predators.

Black bear are found within the aspen-conifer areas on the east side of the Pinedale RMPPA during spring and early summer (BLM 1985). These bears appear to move to higher, more inaccessible areas during midsummer and fall. On the west side of the Pinedale RMPPA, black bear are found in the timbered areas along the Bridger-Teton National Forest boundary and on the Hoback Rim. Some bears appear to remain in this area year-round while others use the area for “hibernation” and early spring range, moving into the higher Bridger-Teton National Forest during summer and fall.

Mountain Lion

Mountain lions are fairly uncommon within the Pinedale RMPPA, but sightings are occasionally reported. Information on mountain lion populations are derived only from harvested individuals. These specimens assist in monitoring health and sex ratios, but do not offer enough data for an accurate population estimate. According to WGFD, harvest information indicates that mountain lion populations are healthy. The Pinedale RMPPA includes lion hunt areas 2, 3, and 17. No mountain lions were harvested in these hunt area during the 2000 hunting season. The 2002 lion quota is 25 for all areas.

Mountain lions are normally found in rocky, rugged terrain and are most abundant in Wyoming in the foothills and low mountain areas (Clark and Stromberg 1987). An abundance of prey and den sites are critical habitat components. Although mule deer are the primary prey species, mountain lions will also eat elk and various small mammals. Den sites may be in caves, rock crevices, dense shrubs, or under logs. Home range size varies from about 40 to 80 sq. km for adult males. Since they depend primarily on mule deer as a prey base, mountain lions will follow their seasonal altitudinal migration patterns (Clark and Stromberg 1987). Mountain lion populations are not currently being monitored and, therefore, little is known about their numbers or habits within the Pinedale RMPPA.

3.19.1.1.2. Small Game

Small game within the Pinedale RMPPA include upland game birds such as sage grouse (*Centrocercus urophasianus*), blue grouse (*Dendragapus obscurus*), ruffed grouse (*Bonasa umbellus*), and mourning dove (*Zenaida macroura*), several species of waterfowl, and several small mammal species including rabbits.

Sage Grouse

Sage grouse are the most numerous and widespread game bird throughout the Pinedale RMPPA and depend almost entirely upon sagebrush-dominated habitats (Benson et al. 1993). Optimal habitat includes large, contiguous expanses of sagebrush with an abundance of tall grasses on flat or gently rolling terrain (Kingery 1998). They also require open areas within this sagebrush community for leks where they perform courtship rituals. Lek sites, otherwise known as strutting grounds, are traditional and usually associated with tall mature sagebrush. Damage to this sagebrush has been known to cause abandonment of the lek (Ellis et al. 1989). Identified lek locations within the Pinedale RMPPA are depicted on Figure 3.19-5. The majority of nest sites are located within 2.5 miles (4 km) of the lek.

Sage grouse broods prefer to feed upon succulent forbs and will move to riparian areas and irrigated fields that support succulent vegetation in late summer and fall (BLM 1985). Their diet consists almost entirely of sagebrush during late fall and winter. The distribution of spring-summer-fall habitat for sage grouse is widespread in the Pinedale RMPPA. In general, all sagebrush types with available water and some vegetation diversity are considered sage grouse habitat. The majority of this habitat appears to be in fair to good condition. The majority of sage grouse summering in the northern portion of the Pinedale RMPPA and those utilizing the higher foothill regions migrate south to the lower sagebrush areas to winter. These areas should be considered crucial to the survival of local populations.

Sage grouse populations in Wyoming are currently in decline. Specific seasonal and daily restrictions to surface-disturbing activities have been developed to protect sage grouse lek and nesting sites. Surface-disturbing activities that are restricted include, but are not limited to: surface occupancy; the construction of roads, pipelines, utility corridors, or other types of rights-of-way; the installation of permanent or high profile structures such as buildings, storage tanks, and overhead transmission lines; the drilling of wells; and the construction of well pads. Restrictions are to be in effect during 1 March to 15 May for up to a two-mile radius of lek sites and during 1 April to 31 July for up to a two-mile radius of nest sites. Such restrictions may be modified or exempted if an acceptable plan to mitigate potential impacts can be developed. Some activities may be allowed if analyses indicate that local sage grouse concentrations will not be adversely affected. Outside of the established buffer zones, approximately 2,360 acres of short-term disturbance to potential sage grouse habitat have occurred from oil and gas development since 1998. An additional 1,145 acres have undergone long-term disturbance from these activities.

Forest Grouse

Blue and ruffed grouse are associated with a variety of forest types with a well-developed shrub understory. Within the Pinedale RMPPA they are restricted to the foothill and mountain areas and are found in association with aspen, conifers, and riparian vegetation. A high diversity of cover types provides optimal habitat for these species during the breeding season. Coniferous forest are used during late fall and winter (BLM 1985). Fringe wooded areas along the Pinedale RMPPA are located within the statewide hunt area for forest grouse. Harvest quotas for all forest grouse are three birds per day during the season.

Mourning Dove

Mourning Doves are a common inhabitant throughout many areas of the Pinedale RMPPA and are considered common throughout the State in summer (Dorn and Dorn 1990). Mourning doves have been recorded on every active Breeding Bird Survey that lie all or partially within the Pinedale RMPPA. Numbers vary considerably based on survey. Survey variances include average yearly counts of 14.33 and 0.33 birds per route on the Sand Draw and Soda Lake surveys, respectively (Sauer et al. 2001).

Mourning doves are generalists and occupy many different habitat types. No assessment of dove habitat conditions has been conducted for the Pinedale RMPPA. Likewise, no information regarding hunting effort or harvest statistics is available. Typically, birds depart from their northern nesting grounds with the advent of cold temperatures in September. Considering that the hunting season opens on September 1 each year, the amount of hunting effort expended on this species in the Pinedale RMPPA is considered minimal.

Waterfowl

The scattered aquatic resources in the Upper Green River Basin provide habitat for at least 24 species of waterfowl (BLM 1985). Within the Pinedale RMPPA, the amount and quality of aquatic habitats potentially suitable for waterfowl fluctuate yearly based on yearly hydrologic conditions. Main waterfowl use areas in the Pinedale RMPPA include: the Upper Green River, its tributaries and adjacent wetlands; the New Fork Pothole area in the northern portion of the Pinedale RMPPA; South Soda Lake; and Fontenelle Reservoir and associated waterbodies in the southern end of the Pinedale RMPPA (the lower Pinedale RMPPA portion of the Upper Green River). The most abundant species found in the Pinedale RMPPA include mallard (*Anas platyrynchos*), green-winged teal (*Anas crecca*), northern pintail (*Anas acuta*), ring-necked duck (*Aythya collaris*), common goldeneye (*Bucephala clangula*), and common merganser (*Mergus merganser*). Waterfowl populations in the Pinedale RMPPA are composed mostly of migrants, though some populations of nesting birds exist. Winter populations are very minimal due to climatic conditions that freeze waterways making them unavailable to waterfowl during winter months.

Though portions of the Green River and its tributaries, and the New Forks Pothole area provide significant populations of nesting waterfowl, waterfowl nesting habitat in the Pinedale RMPPA is typically low due to availability of water and dense vegetative nesting cover adjacent to shorelines. Canada goose populations have increased considerably in the past 15 years throughout many portions of the Pinedale RMPPA. This increase is partially associated with adaptations of geese to use artificial structures for nesting, such as implemented goose and even osprey (*Pandion leucocephalus*) nesting platforms. Geese also require lesser amounts of aquatic habitats than ducks and are adapted to grazing grasses in meadows and hay fields.

Most available water bodies in the Pinedale RMPPA provide staging and migration stopover habitat for waterfowl. South Soda Lake, a fairly large alkaline lake, supports a high population of freshwater shrimp that attracts diving ducks in autumn (BLM 1985).

Waterfowl harvests are dictated by annual harvest regulations developed by USFWS and also by annual nesting success of waterfowl and availability of aquatic habitats. Mallard and green-winged teal typically provide the largest component of harvest each year. The WGFD divides Wyoming into five waterfowl management areas. Harvest statistics for waterfowl are lacking and subjective because no harvest reporting procedures by hunters are required and data is limited to occasional bag checks. Due to a lack of mandatory harvest reporting by hunters, any waterfowl harvest data analyzed would be gross estimates and difficult to interpret.

Small Game Mammals

Four species of small mammals are allowed to be harvested as game animals within the Pinedale RMPPA by WGFD. These include cottontail rabbit (*Sylvilagus* spp.), snowshoe hare (*Lepus americanus*), white-tailed jackrabbit (*Lepus townsendii*), and red squirrel (*Tamiasciurus hudsonicus*). No assessments of habitat condition, estimates of population size, mortality or natality rates, or hunter effort are known for any of these species. In general, cottontail rabbits prefer open areas and are considered common throughout the majority of the Pinedale RMPPA. Snowshoe hare are restricted to coniferous and shrubby areas in mountain areas and are known to occur in forested fringe areas of the Pinedale RMPPA. White-tailed jackrabbits are considered common through open areas. Red squirrels are associated with coniferous areas of mountains and can be found in forested fringes of the Pinedale RMPPA. All small game mammals are included within the statewide hunt unit. Daily per day bag limits include 10 cottontail rabbit, four snowshoe hare, unlimited jackrabbits, and 10 squirrels. All small game mammals have designated hunting seasons, except for jackrabbits.

Furbearers

The following furbearer species occur within the Pinedale RMPPA, but population figures are only available on a statewide basis. Low fur prices have led to a decrease in trapping in recent years. Populations are considered to be stable but no monitoring programs are currently in place.

Badgers (*Taxidea taxus*) can be found throughout the Pinedale RMPPA anywhere from desert areas to high elevations in summer, but are most common in grassland and sagebrush communities (Clark and Stromberg 1987). Badgers require deep soils for daytime burrows and to support fossorial prey species. They are known to prey upon ground squirrels, prairie dogs, mice, rats, rabbits, skunks, and even coyotes. Habitat for badgers in the Pinedale RMPPA is abundant.

Over-trapping of beaver (*Castor canadensis*) in the mid to late 1800s caused local extinctions of beaver throughout most of Wyoming (Clark and Stromberg 1987). Beaver have been reintroduced throughout much of the State and now can be found wherever there is sufficient perennial water and food. Beavers eat a wide variety of leaves, twigs, and inner bark including numerous aquatic plants although aspen and willow are preferred. They remain year-round in the same location by caching branches and twig for winter food. Beaver are currently common in waters throughout the Pinedale RMPPA. Conifer encroachment in the foothills with little aspen regeneration may be reducing habitat quantity and quality for beaver in those areas.

Bobcats (*Felis rufus*) occur in most habitats except high mountain areas. In Wyoming they are commonly found in broken, brushy country with rocky areas and cliffs (Clark and Stromberg 1987). Bobcats are opportunistic feeders, but mainly feed upon small mammals and birds. Good quality habitat is abundant in the Pinedale RMPPA and bobcat populations are thought to be stable.

Coyotes (*Canis latrans*) occur in a wide variety of habitats and are opportunistic feeders. Coyotes occur throughout the Pinedale RMPPA and have been known to prey on livestock. Organized animal damage control occurs in areas with depredation problems.

Mink (*Mustela vison*) are semi-aquatic and require open water for survival (Clark and Stromberg 1987). They feed upon a wide variety of animals including mice, rats, rabbits, muskrat, frogs, fish, crayfish, birds, invertebrates, and snakes and will hunt both in the water and along the adjacent terrestrial communities. Mink are common in riparian habitats throughout the Pinedale RMPPA.

Muskrats (*Ondatra zibethicus*) occupy most aquatic habitats but prefer slow moving water associated with ponds, lakes, marshes, and irrigated ditches. They feed mostly upon aquatic vegetation but will also eat crayfish, fish, and mollusks when available (Clark and Stromberg 1987). Muskrats occur along riparian corridors throughout the Pinedale RMPPA.

Martens (*Martes americana*) inhabit mature spruce-fir, lodgepole pine, and limber pine forests and forest dominated riparian areas. They feed upon a wide variety of foods including small mammals, birds, insects, and fruits and berries (Clark and Stromberg 1987). Martens occupy the forested regions in mountains along the perimeter of the Pinedale RMPPA and may also be found along some portions of the Green and New Fork Rivers between Highways 191 and 189 north of Highway 351 (WBN 1996).

3.19.1.2. Non-Game Species

The diverse habitats present on the Pinedale RMPPA provide for a multitude of non-game species.

3.19.1.2.1. Birds

A myriad of non-game bird species are found within the Pinedale RMPPA. Most songbird populations in the area are those adapted for open areas. The vast sagebrush component of the Pinedale RMPPA provides crucial habitat for major indicators of that type, namely sage Thrasher (*Oreoscoptes montanus*), Brewer's Sparrow (*Spizella breweri*), and sage Sparrow (*Amphispiza belli*). Forests, riparian, and water resources within the Pinedale RMPPA also provide requisite habitat for multitudes of other species as well. Discussion on indicators of those species are discussed later in this section. Except for raptors, management of non-game species, however, is mainly through vicarious management of other species. A discussion of raptor populations within the Pinedale RMPPA is provided below.

3.19.1.2.2. Raptors

Sensitive to environmental perturbations, raptors are high-trophic level predators that provide good indicators to the quality of habitats. The Pinedale RMPPA provides seasonal and year-long habitat for a multitude of raptor species. Six species are listed as either Federally Threatened or as BLM or Forest Service Sensitive or as a species of Special Concern by WGFD: bald eagle (*Haliaeetus leucocephalus*), northern goshawk (*Accipiter gentilis*), ferruginous hawk (*Buteo regalis*), Richardson's merlin (*Falco* *columbarius richardsoni*), peregrine falcon (*Falco peregrinus*), northern pygmy-owl (*Glaucidium gnoma*), great gray owl (*Strix nebulosa*), boreal owl (*Aegolius funereus*), and burrowing owl (*Athene cunicularia*). Discussions of those species are presented in following sections.

Within the vast, open sagebrush areas, common breeding inhabitants of the Pinedale RMPPA include Swainson's hawk (*Buteo swainsoni*), red-tailed hawk (*Buteo jamaicensis*) northern harrier (*Circus cyaneus*), golden eagle (*Aquila chrysaetos*), prairie falcon (*Falco mexicanus*), American kestrel (*Falco sparverius*), and great horned owl (*Bubo virginianus*). Protection of active (and some historic, depending on species) nests is essential in maintaining healthy populations of birds of prey. Nest sites in open, sagebrush areas of the Pinedale RMPPA include scattered trees, cliffs, and snags. Raptor utilization for specific and region-wide areas varies greatly year-to-year and season-to-season depending upon prey availability, habitat quality, level of raptor populations, and other factors. Nesting raptors are typically quite fidel to a nesting territory and may be present for years if no perturbations to the nesting site, habitat, or mate occur. The Pinedale BLM office requires surveys for nesting raptors for impact assessment of various land-use activities and maintains annual mapped locations of all raptor nests found. Other raptor species adapted for open areas that can be found at various portions of the year include: rough-legged hawk (*Buteo lagopus*), a winter resident; snowy owl (*Nyctea scandiaca*), a rare winter visitant; long-eared owl (*Asio otus*), a denizen of both open and forested areas; and short-eared owl (*Asio flammeus*).

Ospreys (*Pandion haliaeetus*) are a common summer resident in the Pinedale RMPPA along waterbodies along the river systems. Placement of artificial nesting structures has increased populations throughout Wyoming and the world.

Non-listed forest raptors within the Pinedale RMPPA include sharp-shinned hawk (*Accipiter striatus*), Cooper's hawk (*Accipiter cooperi*), and northern saw-whet owl (*Aegolius acadicus*).

3.19.1.2.3. Mammals

According to Clark and Stromberg (1987), the Pinedale RMPPA is inhabited by at least 42 species of non-game mammals including five species of shrew, 12 species of bat, 9 species of members of the squirrel family, two species of gopher, 14 species of mice/rats, and porcupine. As additional studies of small mammals in the Pinedale RMPPA occur, this list may increase or decrease as more exact boundaries of range distribution are known. As with most non-game birds, management of these species is provided through maintenance of all habitat types within the Pinedale RMPPA.

3.19.1.2.4. Reptiles and Amphibians

The climate and habitat types found in the Pinedale RMPPA restrict the diversity and abundance of reptiles and amphibians. However, ten species of reptiles and amphibians inhabit the Pinedale RMPPA. These include tiger salamander *(Ambystoma tigrinum*), boreal western toad (*Bufo borea borea*), Great Basin spadefoot toad (*Scaphiopus intermontanus*), boreal chorus frog (*Pseudacris triseriata*), northern leopard frog (*Rana pipiens*), Columbia spotted frog (*Rana pretiosa*), eastern short-horned lizard (*Phrynosoma douglasi*), northern sagebrush lizard (*Sceloporus graciousus*), rubber boa (*Charina bottae*), and wandering garter snake (*Thamnophis elegans vagrans*). No estimates of population size are known for any of these species. Two species, boreal western toad and Columbia spotted frog, are listed species and are discussed further in this document.

3.19.1.3. Special Status Species

3.19.1.3.1. U.S. Fish and Wildlife Listed Species

The discussion below contains information on the Endangered, Threatened, Proposed, and Candidate species that are known or have the potential to occur in the Pinedale RMPPA based upon information from the USFWS.

- Black-Footed Ferret - Black-footed ferrets were once found in low numbers throughout the Great Plains. As a result of widespread extermination of prairie dogs (*Cynomys* spp.), their main prey source, ferrets were reduced to near extinction. The black-footed ferret was designated as a USFWS Endangered species in March 1967 under a precursor to the Endangered Species Act of 1973 (Fed. Reg., 1967). This species is also a WGFD Species of Special Concern. Black-footed ferrets were reintroduced into Shirley Basin in southeastern Wyoming in 1991 and subsequently along the Utah/Colorado border. Currently, introduced populations are susceptible to plague and canine distemper-induced mortality (Williams et al. 1988). Black-footed ferrets are closely associated with prairie dog towns and rely almost entirely on these rodents as prey. Ferrets also use prairie dog burrows for denning and shelter. Potential breeding habitat for this species is present south of Daniel and near Boulder (WNDD 2002). Annual surveys for ferrets are required for all surface-disturbing activities. Despite ongoing surveys for oil and gas development projects within the Pinedale RMPPA, no ferret occurrences have been confirmed. Approximately 59 acres of potential ferret habitat have been impacted by oil and gas development. Of this total, only 13 acres are long-term impacts.

- Gray Wolf - Gray wolves once occurred throughout much of North America, but were extirpated from most of the western U.S. by the 1940s. The gray wolf was designated as a USFWS Endangered species in 1967 (Fed. Reg. 1967). In 1995 and 1996, 31 wolves from southwestern Canada were reintroduced into Yellowstone National Park (USFWS et al. 2002). All wolves currently in Wyoming are classified as a nonessential experimental population allowing for more flexible management guidelines. Current threats to this species include diseases such as canine parvovirus, collisions with vehicles, illegal shooting, and fragmentation of habitat. The gray wolf uses a variety of habitats that support a large prey base including montane and low-elevation forests, grasslands, and desert scrub. The availability of prey, especially large ungulates, is critical to habitat selection. Gray wolves tend to prey upon the young, old, and sick members of ungulate populations and will often supplement this diet with beaver and domestic livestock. By the end of 2001, at least 56 wolves were present in Wyoming outside of Yellowstone National Park (USFWS et al. 2002). In 2001, two new packs, the Big Piney and Pinedale packs, were formed within the Pinedale RMPPA. According to the USFWS et al. Rocky Mountain Wolf Recovery 2001 Annual Report (2002), the Pinedale pack consists of only one pair and the number of wolves in the Big Piney pack is unknown. Members of these two packs are thought to be young dispersers and neither pack has yet produced pups. According to the report, no livestock depredations have been reported from the two packs. Members of the Big Piney and Pinedale packs are not radio-collared and they are not currently being monitored. Therefore, very little information regarding their habits is known at this time.

- Grizzly Bear - Once common throughout the Great Plains, grizzly bears are currently restricted to forests that contain moist meadows and grasslands, typically in or near mountains. They require large tracts of undisturbed habitat with minimal human activity. Grizzly bears are omnivores and will feed upon a wide variety of things including fish, small mammals, ants, elk, grass, berries, and pine nuts. They will often follow ungulate herd seasonal movements, using lower elevations in spring and moving to higher altitudes prior to hibernation. Home ranges have been estimated between 35 and 1,550 square miles (Craighead and Mitchell 1982), which varies according to age, sex, and habitat quality. One of the key reasons for the decline of grizzly bears in North America is increased mortality due to habitat loss (Moody et al. 2002). These bears are especially susceptible to disturbance caused by roads and have been known to avoid roads. The degree of avoidance may vary with traffic volume and females with cubs are more easily disturbed. The grizzly bear was listed as an Endangered species in 1967 and subsequently reclassified as Threatened in 1975 (Fed. Reg. 1975). The current range of the grizzly bear in the lower 48 states includes Montana, Idaho, Wyoming, and Washington. In Wyoming, grizzly bears currently occupy Yellowstone and Grand Teton National Parks and portions of adjacent National Forest and private lands extending south in the Wind River Range to the Green River Lakes area (Moody et al. 2002). The Green River Lakes area is just outside the northern boundary of the Pinedale RMPPA. Currently, no occurrences of grizzly bears in the Pinedale RMPPA have been confirmed. Potential habitat for grizzly bears exists in forested regions of the Wyoming and Wind River ranges along the perimeter of the Pinedale RMPPA. Grizzly bears may occur within the Pinedale RMPPA in the future if the southward expansion of northern populations continues.

- Canada Lynx - The Canada lynx was designated as a USFWS Threatened species in April 2000 (Fed. Reg. 2000). This medium-sized cat is found in the United States along the mountains of the Pacific Coast, the northern Rocky Mountains, the upper Great Lakes, and in the extreme northeast. The primary reasons for listing are the inadequacy of existing regulatory mechanisms along with current land use and management practices that may threaten this species or its restricted habitat. This large, snow-adapted cat is typically associated with high-elevation forested areas that support ample populations of snowshoe hares and other preferred prey species. In the northern Rocky Mountains, lynx are associated mostly with Douglas fir and spruce/fir forest types (McKelvey et al. 2000). Critical habitat for the Canada lynx has not been designated. In Wyoming, there have been fewer than 50 verified records of the Canada lynx since the mid 1850s – most of these being from the northwest mountains (McKelvey et al. 2000). This species also occurs in the central and extreme north-central mountains. Within the Pinedale RMPPA, this species occurs sparingly along the west boundary and has also been sighted southeast of Pinedale (WNDD 2002). Lynx are highly susceptible to human disturbances and habitat fragmentation.

- Bald Eagle - The bald eagle is a USFWS Threatened species and a WGFD Species of Special Concern. This species was declassified from USFWS Endangered status in 1995 (Fed. Reg. 1995). Bald eagles nest, winter, or migrate throughout most of the United States. Populations of bald eagles were most dramatically affected by the pesticide DDT in the 1950s and 1960s. Since the banning of DDT use in 1972, negative impacts have continued from illegal killing and the loss of, and interference to, nest sites, although populations have increased. Bald eagles typically nest in large trees near open waterways, but will occasionally nest in trees within prairie or scrubland habitat. Bald eagles will also nest on cliffs and, rarely, on the ground (Johnsgard 1990). Since this species returns to the same nest year after year, nests can become quite large and heavy. In Wyoming, bald eagles breed in the northwest and south-central regions and migrate throughout. In the Pinedale RMPPA, wintering bald eagles have been observed at the Fontenelle Reservoir, near Pinedale, west of Daniel, southwest of Boulder, and in the southeast area (WNDD 2002). Seven bald eagle nests are known to occur scattered throughout the Pinedale RMPPA.

- Whooping Crane - Though probably never very numerous throughout its range, whooping crane populations have been reduced as a result of hunting, collisions with power lines, disease, and predation. Whooping cranes nest in marshes, bogs, and other wetland areas having still water and sufficient prey base. The nests are usually built on mats of vegetation. In 1967, the whooping crane was designated as a USFWS Endangered species (Fed. Reg. 1967). In 1975, an attempt to create a second wild flock with an alternate migratory route was initiated by using sandhill cranes (*Grus canadensis*) as "foster parents." Sandhill crane eggs were replaced with whooping crane eggs at Grays Lake National Wildlife Refuge in Idaho, which is located approximately 75 miles west of the Pinedale RMPPA. The project ultimately failed when the whooping crane chicks imprinted on sandhill cranes and refused to recognize their own species. Birds did learn to migrate with sandhills to their wintering grounds at Bosque Del Apache National Wildlife Refuge in New Mexico and the Pinedale RMPPA lies within the periphery of that migration path. In Wyoming, the whooping crane is considered a spring and fall migrant. Within the Pinedale RMPPA, this species has been seen in the northern region and near Big Piney (WNDD 2002). In 1997, the Rocky Mountain population was designated as Experimental Nonessential (Fed. Reg. 1997). Currently, only one individual from that experimental introduction remains alive. The only self-sustaining wild population of whooping cranes nest in the Northwest Territories and Alberta, Canada, although additional reintroduction attempts have been initiated in Wisconsin and Florida.

- Mountain Plover - The mountain plover was designated as a USFWS Proposed Threatened species in 1999 (Fed. Reg. 1999). This species currently breeds primarily in portions of Montana, Wyoming, Colorado, and New Mexico. Conversion of grasslands, agricultural practices, and livestock management have been credited with the decline of this short-grass prairie and shrub-steppe species. Short vegetation, bare ground, and flat terrain, such as the areas typical of prairie dog towns, appear to be key habitat characteristics for this species. Though currently considered fairly common throughout Wyoming, oil and gas leasing and development in the southwest region of the State have specifically been indicated as potential threats to this species. Within the Pinedale RMPPA, mountain plovers are known to nest southeast of Big Piney and southwest of Boulder (WNDD 2002). No estimates of population size are known from the Pinedale RMPPA.

- Yellow-Billed Cuckoo - Western populations of the yellow-billed cuckoo (*C. a. occidentalis*) are believed to be a distinct population that varies genetically from cuckoos found in the eastern U.S., though there is debate whether subspecific designation is warranted for that geographical group. In July 2001, responding to a petition to list the western yellow-billed cuckoo under the Endangered Species Act, the USFWS determined that such a listing was warranted but precluded by higher priority listing actions (Fed. Reg. 2001). As a result, the western yellow-billed cuckoo has been designated as a Federal Candidate species. The western yellow-billed cuckoo is also a BLM and Forest Service Sensitive species, as well as a WGFD Species of Special Concern. Though adequate historical data are lacking, this species is believed to have been fairly common along riparian cottonwood (*Populus* spp.) corridors throughout much of the West. This species has declined in response to habitat reduction and degradation. The yellow-billed cuckoo prefers large tracks of deciduous riparian woodlands with dense, scrubby undergrowth. This species frequently utilizes willow thickets for nesting and forages among large cottonwoods (Bennett and Keinath 2001). The yellow-billed cuckoo may also nest near water in urban parks, orchards, or overgrown pastures (WGFD 1997). This bird winters in Central and South America. In Wyoming, the western subspecies of the yellow-billed cuckoo is considered uncommon and is primarily found along waterways in the lower Green River Basin. The species has been documented within the Pinedale RMPPA, though currently there are no known nest sites (WNDD 2002).

- Columbia Spotted Frog - In 1999, the USFWS listed the Columbia spotted frog as a Candidate species (Fed. Reg. 1999a). The Columbia spotted frog is also a BLM and Forest Service Sensitive species, and a WGFD Species of Special Concern. This frog is found in western Wyoming and Montana, northern Utah and Nevada, eastern Oregon and Washington, and throughout Idaho. Habitat loss, predation, and environmental perturbations have been cited as factors contributing to the general decline of frog populations (Fisher and Shaffer 1996). Columbia spotted frogs live in or near permanent bodies of water. They prefer areas with thick algae and vegetation for cover. They are most often found in non-woody wetland plant communities (Leonard et al. 1993). Suitable habitat occurs throughout western Wyoming. Within the Pinedale RMPPA, this species was recorded in 1979 near the East Fork River in the northern portion of the Pinedale RMPPA (WNDD 2002).

3.19.1.3.2. BLM Sensitive Species

BLM defines sensitive species as species that could easily become endangered or extinct in a state unless protection is granted. Designated sensitive species are provided the same level of protection by the BLM as Federal candidate species. All Federally listed Endangered, Threatened, Proposed, and Candidate species also carry a BLM designation as Sensitive. Following are discussions on the known status of each such species within the Pinedale RMPPA, unless it has been previously discussed above:

- Dwarf Shrew - The dwarf shrew is a BLM and Forest Service Sensitive species, as well as a WGFD Species of Special Concern. Very little is known about the natural history of this diminutive insectivore. Its known distribution generally follows the Rocky Mountains. Until more information is collected, definitive population trends and threats to this species cannot be determined. Dwarf shrews have been found in a variety of habitats but seem to prefer high-elevation rocky areas in woodlands, grasslands, and alpine tundra, typically near water (Brown 1967). In Wyoming, the dwarf shrew is distributed along either side of the Rocky Mountains. Potential habitat occurs along the perimeter of the Pinedale RMPPA. Leuce et al. (1997) reported this species as possibly breeding in latilong (a one degree block of latitude and longitude, numbered within each state) 16 but provided no evidence of its occurrence in latilong 15.

- Long-Eared Myotis - The long-eared myotis is a BLM Sensitive species and a WGFD Species of Special-Concern. This species is found throughout the western United States. Threats to this species include logging and the destruction or alteration of roost and maternity sites. The long-eared myotis is frequently found roosting under the bark or within cavities of ponderosa pine (*Pinus ponderosa*) trees during the daytime, though it can also be found at much higher and lower elevations. This species will use caves, mines, and buildings for maternity and night roosts. Long-eared myotis primarily feed upon moths and beetles but other insects including lacewings, true bugs, wasps and bees are eaten. In Wyoming, this species may be locally abundant in the vicinity of preferred roost sites. The long-eared myotis is likely scattered throughout the Pinedale RMPPA where there are large stands of ponderosa pines or other suitable roost sites. Leuce et al. (1997) reported this species as occurring in latilong 15 and documented an historical account from latilong 16.

- Pygmy Rabbit - The pygmy rabbit is a BLM Sensitive species and a WGFD Species of Special Concern. The subspecies of pygmy rabbit that is found in Wyoming is distinct from the more-imperiled Washington subspecies. The range of this smallest of North American rabbits includes the Great Basin regions of Wyoming, Oregon, Idaho, Montana, California, Utah, and Nevada (WDFW 1995). The primary factor contributing to the decline of the pygmy rabbit throughout its range has been loss of habitat due to land development and agricultural conversion. The pygmy rabbit is the only rabbit native to North America that digs its own burrows. It is also uniquely dependent upon sagebrush (*Artemesia* spp.), which comprises a majority of its winter diet. Dense sagebrush and relatively deep, loose soils are important characteristics of pygmy rabbit habitat (Green and Flinders 1980). Wyoming is considered to be on the eastern edge of the pygmy rabbit range. Within the Pinedale RMPPA, this species was reported during the 1970s and 1980s south of Pinedale and west of Fontenelle Reservoir (WNDD 2002). However, the current status of the species within this area is unknown.

- White-Tailed Prairie Dog - The white-tailed prairie dog is listed as a BLM Sensitive species. This species is found primarily in western Wyoming, west and northwest Colorado, and northeast Utah. Systematic eradication, conversion of grasslands, and disease have all contributed to the decline of this species. White-tailed prairie dogs are found in a variety of grassy habitats including mountain valleys, mesas, and shrubby and semi-desert grasslands (Clark et al. 1971). White-tailed prairie dogs occur throughout western Wyoming. In the Pinedale RMPPA, this species occurs near Big Piney, Boulder, and in the east region (WNDD 2002).

- Idaho Pocket Gopher - The Idaho pocket gopher is a BLM Sensitive species. This species occurs in two populations – one in southwestern Montana and eastern Idaho, and the other in western Wyoming, northeast Utah, and extreme southeast Idaho (Thaeler 1972). Threats to this species include conversion of native habitat for development and agriculture, and indiscriminant eradication. Idaho pocket gophers have been found in subalpine mountain meadows, shrub steppes, and various grasslands, although they appear to favor rocky, shallow soils. This species is found in west and west-central Wyoming. Within the Pinedale RMPPA, Idaho pocket gophers have been documented in the northwest, near Big Piney, and in the extreme eastern region (WNDD 2002).

- White-Faced Ibis - The white-faced ibis is a BLM and Forest Service Sensitive species, and a WGFD Species of Special Concern. This species is scattered throughout the western states during summer, with concentrations along the Texas gulf, in eastern Idaho, and in northwest Nevada (Voeks and English 1981). The loss and alteration of freshwater marshes, its primary nesting and foraging habitat, have lead to the decline of this species. In Wyoming, this bird breeds in various locales in the southwest corner of the State and is considered an uncommon summer resident. Within the Pinedale RMPPA, the white-faced ibis has been confirmed as nesting in latilong 15 and 16, which form the western and eastern portions of the Pinedale RMPPA, respectively (Leuce et al. 1997). White-faced Ibis have also been documented north of Fontenelle Reservoir (WNDD 2002). No estimates of nesting numbers of birds are known for the Pinedale RMPPA.

- Trumpeter Swan - The trumpeter swan is listed by the BLM and Forest Service as a Sensitive species, and a WGFD Species of Special Concern. Three major populations occur in the world and include the Pacific Coast, Rocky Mountain, and Interior populations. The Rocky Mountain population is distributed sporadically throughout northern portions of the western U.S. and Canada. Fond of lakes, ponds, marshes, and other wetlands areas, trumpeter swans are found in Wyoming in the extreme eastern and western regions. Though current threats to this species include loss of habitat, predation, and illegal hunting, populations in the Rocky Mountain population has increased 46 percent since 1995 (Caithamer 2001). Within the Pinedale RMPPA, this species summers southwest of Boulder and winters in the southeast region if open water persists (WNDD 2002). According to Leuce et al. 1997, trumpeter swans have been observed in both latilongs 15 and 16, which comprise the western and eastern portions of the RMPPA.

- Northern Goshawk - The northern goshawk is a BLM and Forest Service Sensitive species, and a WGFD Species of Special Concern. This raptor is found throughout the western and northern United States, as well as southern Canada. Nesting in large coniferous forests and mixed woodlands, the northern goshawk has been negatively impacted by habitat loss from logging and development. The Interior Columbia Basin Scientific Team (USDA 1997, USDI 1997) determined that goshawk populations have a 53 percent chance of losing viability in Nevada, Utah, southern Idaho and southwest Wyoming under current Federal management plans. Where suitable habitat is present, this species is still considered fairly common in Wyoming. The limited amount of forested areas in the Pinedale RMPPA indicates that few nesting goshawks are present. Goshawks have been confirmed as nesting, however, in latilong 15 and 16 (Leuce et al. 1997) and are known to winter east of Pinedale, north of Fontenelle Reservoir, and in the southeast region (WNDD 2002).

- Ferruginous Hawk - The ferruginous hawk is a BLM and Forest Service Sensitive species, and a WGFD Species of Special Concern. These hawks nest or winter throughout the West. Habitat losses from cultivation, resource exploration, and surface developments have led to the decline of this species (Dechant et al. 1999). Ferruginous hawks are raptors of prairie grasslands, hayfields, and pastures. They construct their big, bulky nests in lone trees, on rock ledges, and occasionally on the ground. Ferruginous hawks will only nest in areas with abundant prey, typically small rodents (Woffinden and Murphy 1983). Ferruginous hawks breed throughout Wyoming and are considered fairly common. This species occasionally winters in the extreme southern region. Within the Pinedale RMPPA, the species is uncommon and is known to breed in scattered locations, especially areas southwest of Boulder and north of Fontenelle Reservoir. Small numbers are known to winter near Pinedale and in the southeast portion of the Pinedale RMPPA (WNDD 2002). The BLM maintains mapping of known ferruginous hawk nests within the Pinedale RMPPA gathered from on-site nesting surveys, WNDD data, and Breeding Bird Surveys (BBS).

- American Peregrine Falcon - The American peregrine falcon (*F. p. anatum*) is a BLM Sensitive species and a WGFD Species of Special Concern. In 1999, this species was removed from the USFWS Endangered Species List (Fed. Reg. 1999b). The peregrine falcon is primarily distributed locally west of the Rocky Mountains, though populations have been established throughout the United States. Despite having recovered from a dramatic DDT-related decline, threats from disturbances to nest sites, predation, illegal shooting, and loss of habitat are still present (Cade et al. 1988). Peregrine falcons nest on high cliffs, trees, high riverbanks, towers, and tall buildings (Savage 1992). This species is considered uncommon throughout most of Wyoming. The subspecies has been confirmed as nesting within latilong 16 and has also been observed in latilong 15 during the nesting season (Leuce et al. 1997).

- Greater Sage Grouse - Refer back to Section 3.19.1.1.2 for information pertaining to the greater sage grouse.

- Long-Billed Curlew - The long-billed curlew is a BLM and Forest Service Sensitive species, and a WGFD Species of Special Concern. This species occurs throughout the western United States and southern regions of the western Canadian provinces. Currently, the major threat to this species is the loss and degradation of breeding habitats (USDA 2000). Long-billed curlews usually nest in prairie and grassy meadows near water, but occasionally choose dry upland sites. During migration, these birds utilize shores, beaches, and grain fields (Cochran and Anderson 1987). Considered uncommon in Wyoming, the long-billed curlew nests in suitable habitat in various locales throughout the State. In the Pinedale RMPPA, this species nests in scattered areas throughout the northern half and near Fontenelle Reservoir (WNDD 2002). Leuce et al., also confirm curlews breeding in latilong 15 and as a possible breeder in latilong 16. The Big Sandy Breeding Bird Survey has recorded long-billed curlews an average of 4.4 times per year along its route and the species has also been seen at least once on the Fontenelle Breeding Bird Survey (Sauer et al. 2001). No estimates of population size within the Pinedale RMPPA are known.

- Burrowing Owl - The burrowing owl is a BLM and Forest Service Sensitive species, and a WGFD Species of Special Concern. This species is distributed throughout the West. Burrowing owls nest in grassland, scrub, and steppe areas, usually utilizing burrows excavated by other animals (Martin 1973). The loss of nesting habitat, and the extermination of burrow-digging mammals, has led to the decline of this species throughout its range (Desmond et al. 2000). The burrowing owl is considered uncommon in most of Wyoming, though it is locally abundant in some areas. Within the Pinedale RMPPA, the burrowing owl is known to nest throughout the central and eastern regions (WNDD 2002).

- Sage Thrasher - The sage thrasher is a BLM Sensitive species that breeds in most of the western states. The sage thrasher nests in large, open tracts of dry shrub and grassland with dense stands of sagebrush, bitterbrush (*Purshia tridentate*), or rabbitbrush (*Chrysothamnus* spp.). Nesting shrubs need to be tall and sturdy to support bulky nests and dense enough to provide shade. Nests are typically bulky structures of coarse twigs, bark strips, and plant stems lined with fine grasses (Rich 1980). The loss of habitat is the primary threat to this species (Braun et al. 1976). The sage thrasher is considered a somewhat common summer resident in Wyoming (Dorn and Dorn 1990). Within the Pinedale RMPPA, this species is known to nest west of Daniel, south of LaBarge, and southwest of Boulder (WNDD 2002). Sage thrashers have been recorded on three different Breeding Bird Surveys that lie all or partially within the Pinedale RMPPA. High counts include yearly averages of 49.67 and 30.00 birds per route for the Sand Draw and Big Sandy surveys, respectively (Sauer et al. 2001).

- Loggerhead Shrike - The loggerhead shrike is a BLM and Forest Service Sensitive species. The range of this species includes most of the western and southern United States. Declines in loggerhead shrike population have been attributed to loss of habitat, predation, collisions with vehicles, and pesticide poisoning (Morrison 1981). Loggerhead shrikes generally prefer open country with shrubs and low trees for nesting and spiny shrubs for impaling prey items (Porter et al. 1975). Loggerhead shrikes are considered fairly common throughout Wyoming. In the Pinedale RMPPA, this species has been documented north of Fontenelle Reservoir (WNDD 2002). Leuce et al. (1997) reported confirmed nesting of this species in latilongs 15 and 16.

- Brewer's Sparrow - The Brewer's sparrow is listed as a BLM Sensitive species. This species breeds throughout most of the western United States. Loss and alteration of nesting habitats have contributed to the decline of this species (Schroeder and Sturges 1975). Brewer's sparrows breed in high elevation shrubs and thickets, as well as sagebrush deserts. This species is commonly associated with areas that have healthy shrubby vegetation interspersed within a grassland (Rotenberry et al. 1999). This species is considered somewhat common in Wyoming (Dorn and Dorn 1990). Within the Pinedale RMPPA, Brewer's sparrows are known to nest in the north region, west of Daniel, southwest of Boulder, north of Fontenelle Reservoir, and in the extreme east (WNDD 2002). Brewer's sparrows have been recorded on four different Breeding Bird Surveys that lie all or partially within the Pinedale RMPPA. High counts include yearly averages of 41.80 and 26.00 birds per route for the Big Sandy and Boulder surveys, respectively (Sauer et al. 2001).

- Sage Sparrow - The sage sparrow is a BLM Sensitive species. This species breeds in the west-central states and winters in the Southwest. Threats to sage sparrows include development and conversion of sage-scrub areas. The sage sparrow nests in large tracts of arid shrub and sagebrush communities. The sage sparrow breeds throughout most of Wyoming and is considered to be uncommon (Dorn and Dorn 1990). Within the Pinedale RMPPA, this species is known to nest west of Danial, south of LaBarge, and southwest of Boulder (WNDD 2002). Sage sparrows have been recorded at least two different Breeding Bird Surveys that lie all or partially within the Pinedale RMPPA. Numbers vary considerably based on survey. Average yearly counts of 48.00 and 6.83 birds per route have been recorded on the Boulder and Fontenelle surveys, respectively (Sauer et al. 2001).

- Boreal Western Toad - There are two distinct populations of boreal western toad (*Bufo boreas boreas*) found in Wyoming – the southern Rocky Mountain population in the southeast region of the State and the northern Rocky Mountain population in the west region (Goebel 2000). The northern population is the one that occurs within the Pinedale RMPPA. This population is considered Sensitive by both the BLM and Forest Service. Current threats to this species include the loss or modification of habitat, over-utilization for recreational and scientific purposes, and increased susceptibility to the fatal chrytrid fungus (Carey 1993). Boreal western toads can be found breeding in wet meadows, ponds, marshes, and other shallow waters in spring. In summer, this species utilizes upland montane sites, usually within 300 to 1,500 feet of the breeding ponds. During hibernation, boreal western toads seek shelter under rocks, logs, or within rodent burrows (Keinath and Bennett 2000). In 2000, several adults, tadpoles, and metamorphs were discovered downstream of the confluence of the Middle and South Sawmill creeks on BLM-managed land, about 10 miles northwest of La Barge, Sublette County. Within the Pinedale RMPPA, this species has also been found in the central and east-central regions (WNDD 2002).

- Northern Leopard Frog - The northern leopard frog is a BLM and Forest Service Sensitive species. This species is found throughout the northern and southwestern United States, with restricted ranges in California, Oregon, Washington, and Idaho. Loss of habitat, predation, environmental contaminants, and recent atmospheric changes have been cited as contributing to the decline of this species (Jennings and Scott 1991). The northern leopard frog breeds locally throughout Wyoming. Within the Pinedale RMPPA, suspected breeding sites for this species exists in the central and east-central regions (WNDD 2002). Leuce et al. (1997) report observations of the species in latilongs 15 and 16 but did not report confirmation of breeding.

3.19.1.3.3. Other Special Status Species

The Forest Service and WGFD have also designated various species as Sensitive or Special-Concern. WGFD Species of Special-Concern include those species that are vulnerable to extinction at the global or state level due to inherent rarity, loss of habitat, or sensitivity to human-caused mortality or habitat disturbances.

Some species listed as Sensitive by Forest Service are not listed by BLM due to significant habitat or range differences. However, where range and habitats overlap, especially for Forest Service lands that lie adjacent to BLM-managed lands, the BLM also tracks the status of populations and habitat for those species listed by Forest Service. In addition, in March 1990, a Memorandum of Understanding (MOU) between the Wyoming Game and Fish Department (WGFD) and BLM Wyoming for Management of the Fish and Wildlife Resources on the Public Lands was signed. The purpose of the MOU was for the two agencies to work together to benefit all wildlife in Wyoming by cooperating in planning and sharing data, among other efforts. As a result, BLM also tracks the status of populations and habitat for some species not listed by BLM as Sensitive but listed as Special-Concern by the State of Wyoming.

A discussion on the known status and distribution of each of those species is discussed below.

- Water Vole - The water vole (*Microtus richardsoni*) is a Forest Service Sensitive species and a WGFD Species of Special Concern. This species is distributed discontinuously throughout the upper West. This species may be affected by the loss of suitable habitats. The water vole lives in semi-aquatic habitats of sub-alpine meadows and alpine areas. This species lives near water, generally along stream and creek banks or around flooded marshes. The water vole is found more often in old-growth stands, compared to mature forest stands. Populations of this species are found in areas with a high percent of exposed soil and a low percentage of canopy cover (Doyle 1987). Wyoming represents the eastern range periphery of the western race of the species. There is confirmed breeding of water voles in latilong 16 and an historic record from latilong 15 (Leuce et al. 1997). Although populations are not well-known, potential habitat for this species occurs along the periphery of the Pinedale RMPPA.

- Ringtail - The ringtail (*Bassariscus astutus*) is a Forest Service Sensitive species. This species occurs west of the Mississippi River and roughly south of Idaho. Population trends, as well as general ecology, of ringtails are not well known.

Predation, trapping, and collisions with vehicles have been cited as potentially being detrimental to this species (Fitzgerald et al. 1994). Ringtails live in a variety of habitats within their range, but they have a decided preference for areas such as rock piles, canyon walls, and talus slopes. The species appears well-adapted to dry climates and is usually found in arid or semi arid regions. In Wyoming, this species is known only from the extreme southwest corner. No ringtails are known to inhabit the Pinedale RMPPA. Leuce et al. (1997) did not report any observation of the species in latilongs 15 and 16.

- Wolverine - The wolverine (*Gulo gulo*) is a Forest Service Sensitive species and a WGFD Species of Special Concern. The loss of habitat, over-exploitation, and the reduction of prey base have contributed to the decline of this species (Hornocker and Hash 1981). Wolverines have been found in a variety of habitats but are most commonly associated with boreal forest and tundra areas. Home ranges can extend up to 250 square miles. Wolverines have been reported locally throughout the mountains of Wyoming. Within the Pinedale RMPPA, this species has been reported near Boulder Lake and Cora (WNDD 2002).

- Harlequin Duck - The harlequin duck is a Forest Service Sensitive species and a WGFD Species of Special Concern. This species generally occurs along the Pacific Northwest and the extreme Northeast coasts. Threats to this species generally stem from disturbances to, or loss of, breeding habitats. Harlequin ducks breed along small, clear turbulent streams and rivers with a high abundance of aquatic invertebrates. Nests are constructed under cover along the shore on cliffs, and occasionally in tree cavities. Northwestern Wyoming is considered to be at the eastern boundary of the harlequin duck breeding range. The species has been confirmed breeding in latilong 15, which contains roughly the western half of the Pinedale RMPPA. The species has also been observed in latilong 16, which contains the eastern portion of the Pinedale RMPPA. No estimate of population size within the Pinedale RMPPA is known.

- Merlin - The merlin (*Falcon columbarius*) is a Forest Service Sensitive species and a WGFD Species of Special Concern. This species breeds in the northern Rocky Mountains and extreme northern states, as well as throughout Canada. In Wyoming, the race typically found is Richardson's merlin (*F. c. richardsoni*), the prairie race. Merlin populations have been slowly increasing since the banning or controlled used of harmful pesticides. Merlins nest in the canopy of large trees, often in association with old nests of other birds. They seem to prefer coniferous forests for nesting, but will also utilize variety of mature forested habitats. Preferred habitats are usually intermixed with suitable foraging areas, such as shorelines, meadows, and recently cleared areas (DeGraaf et al. 1991). In Wyoming the Richardson's merlin is a year-round resident in Lincoln and Sublette Counties, though many birds migrate south for the winter. Dorn and Dorn (1990) maintain the subspecies is rare in Wyoming during the nesting season. Leuce et al. (1997) report confirmation of breeding merlins in latilongs 15 and 16. A single merlin was also found on the Big Sandy Breeding Bird Survey in 1990 (Sauer et al. 2001). This species has also been known to winter in the southeast region of the Pinedale RMPPA (WNDD 2002).

- Arctic Peregrine Falcon - The arctic peregrine (*Falco peregrinus tundrius*) is a WGFD Species of Special Concern. In 1999, this species was removed from the USFWS Endangered Species List along with the peregrine falcon (*Falco peregrinus anatum*) (Fed. Reg. 1999b). The arctic peregrine breeds in the Arctic Circle and winters along the East and West coasts, the extreme Southwest, and throughout Mexico. Though not affected by pesticide poisoning to the extent the peregrine falcon has been, threats from disturbances to nest sites and loss of habitat are still present (Cade et al. 1988). Arctic peregrine falcons nest in the treeless tundra on cliffs or bluffs and are usually near rivers or lakes that provide habitat for the shorebirds, songbirds, and waterfowl. The arctic peregrine is considered a migrant in all counties in Wyoming. Peak migration periods in the State are April/May and September/October.

- Forster's Tern - The Forster's tern (*Sterna forsteri*) is a WGFD Species of Special Concern. These birds generally breed west of the Great Lakes, along the Gulf of Mexico, and along the east-central coast. Loss of nesting habitat due to high water levels, lakeshore development, and wetland filling have contributed to the decline of this species. Forster's terns nest along large marshes, estuaries, inland lakes, and reservoirs (Bergman, et al. 1970). In Wyoming, this species breeds in the southeast and southwest corners of the State, including Lincoln County. Within the Pinedale RMPPA, Forster's terns are known to breed on the north end of Fontenelle Reservoir in latilong 15 (WNDD 2002). The species has also been observed in the eastern portion of the Pinedale RMPPA in latilong 16 (Leuce et al. 1997).

- Black Tern - The black tern (*Chlidonias niger*) is a Forest Service Sensitive species and a WGFD Species of Special Concern. This bird breeds primarily in the northern half of the United States west of Michigan. Threats to this species include loss of nesting habitat and nest site disturbances. Black terns nest along inland marshes and sloughs with fairly dense cattail (*Typha* spp.) or other marsh vegetation and pockets of open water. These wetlands are often shallow in nature (Dunn and Agro 1995). Within the Pinedale RMPPA, there is circumstantial evidence that black terns nest in Lincoln County within latilong 15 of the Pinedale RMPPA and they also have been observed in latilong 16 in the eastern portion of the Pinedale RMPPA (Leuce et al. 1997). No estimates are known of population size within the Pinedale RMPPA.

- Northern Pygmy Owl - The northern pygmy owl (*Glaucidium gnoma*) is a WGFD Species of Special Concern. This relatively non-migratory species breeds locally in most of the western states. Predation and loss of prey base may negatively affect this species. Northern pygmy owls nest in coniferous and mixed forests containing open spaces and clearings. They frequently hunt during the day in open fields, wetlands, at the edge of meadows, and in other clearing. These owls frequently use old woodpecker cavities for their nests (Holt and Peterson 2000). According to Leuce et al. (1997), northern pygmy-owls have been confirmed as nesting in latilong 15, but have not been observed in latilong 16.

- Great Gray Owl - The great gray owl (*Strix nebulosa*) is a Forest Service Sensitive species and a WGFD Species of Special Concern. This bird breeds throughout the northern United States and at higher elevations in the Rocky Mountain states. Great gray owls have been negatively affected by the loss and degradation of habitat. In the western states, the great gray owl inhabits dense montane coniferous forests. During the summer this owl rarely utilizes open areas. In winter, forest edges, fields, scrubland, or other open areas are sometimes utilized (Bull et al. 1988). In the Pinedale RMPPA, great gray owls are thought to possibly breed in latilong 16 and have been observed in latilong 15 (Leuce et al. 1997).

- Boreal Owl - The boreal owl (*Aegolius funereus*) is a Forest Service Sensitive species and a WGFD Species of Special Concern. This owl breeds in the boreal forests of the extreme northern United States and the montane West, as well as throughout Canada. The loss and fragmentation of habitat pose a threat to this species. Boreal owls inhabit dense stands of mature coniferous trees in areas typically adjacent to small meadows. Since they cannot excavate their own nest sites, they frequently rely on cavities created by other species such as woodpeckers (Marco 1995). Boreal owl has been observed nesting near Big Piney (WNDD 2002). Leuce et al. (1997), however, did not document the species in latilongs 15 and 16. Based on confirmed breeding near Big Piney, the boreal owl may be a year round resident of higher elevation coniferous forests within the Pinedale RMPPA. If present within the Pinedale RMPPA, the small degree of upper elevation coniferous forests within the area suggests that populations of this species are very small.

- Lewis' Woodpecker - Lewis' woodpecker is a Forest Service Sensitive species and a WGFD Species of Special Concern. This bird breeds locally throughout the West. Habitat fragmentation and silviculture may have contributed to this decline of this species. Lewis' woodpeckers utilize ponderosa pine forests, open riparian woodland dominated by cottonwood, and logged or burned pine forest. This species is also found at low elevation oak and mixed-conifer woodlands. Important aspects of breeding habitat include an open canopy, a brushy understory offering abundant insects, dead or downed woody material, and available perches (Hadow 1973). Leuce et al. (1997) documented breeding in latilong 15 and possibly nesting in latilong 16. Many northern populations of this species retract southward in winter. It is possible that occasional over-wintering by this species occurs within the Pinedale RMPPA.

- Three-Toed Woodpecker - The three-toed woodpecker is a Forest Service Sensitive species and a WGFD Species of Special Concern. This species breeds locally throughout the Rocky Mountain and Pacific Northwest states. The three-toed woodpecker nests in older, dense coniferous forests, and in areas with natural clearings from disease, fire, or windfall (Yunick 1985). This species requires an abundance of insects in the vicinity of its nest. Forest management practices that remove dead or downed trees and habitat fragmentation have negatively affected this species. Wooded fires, however, can create excellent habitat for many species of woodpeckers by killing trees and allowing wood-boring grubs, a staple food base for woodpeckers, to flourish. Leuce et al. (1997) confirmed nesting of three-toed woodpeckers in latilong 15 and possible breeding in latilong 16. No estimates of population size within the Pinedale RMPPA are known, though numbers are expected to be very small due to the small amounts of coniferous forests within the area.

- Golden-Crowned Kinglet - The golden-crowned kinglet (*Regulus satrapa*) is a Forest Service Sensitive. This species breeds in the West, Northeast, and upper Great Lakes, and winters throughout the United States. Golden-crown kinglets nest in coniferous forests and are very active birds that frequently hover above the ends of tree branches in search of prey (DeGraaf et al. 1991). Loss of habitat is the major negative impact to this species. In Wyoming, golden-crowned kinglets are considered year round residents of Lincoln and Sublette Counties. Leuce et al. (1997) confirmed nesting of this species in latilong 15 and possible breeding in latilong 16. Golden-crowned kinglets are also known to winter northeast of Pinedale and in the southeast region (WNDD 2002). No estimates of breeding population size are known for the Pinedale RMPPA. Due to the small amount of coniferous forests within the Pinedale RMPPA, nesting populations of this species are probably quite small.

3.19.2. FISHERIES

Fisheries in the Pinedale RMPPA are restricted within the upper Green River Basin above Fontenelle Reservoir. The reaches of the Green River and its tributaries in this area are moderately productive cold water fisheries, with some reaches having limited fisheries potential. The area is currently managed as a trout fishery and serves as a key management area for the Colorado River cutthroat trout (*Oncorhyncus clarki pleuriticus*) (the only native trout species in the Pinedale RMPPA).

Currently, many of the native species that were historically common throughout the area are either uncommon or have been extirpated. This can be partially attributed to wide-spread poisoning of the area in September 1962 and introduction of non-native game species. Additionally, hydromodification of the Green River and its tributaries for agricultural, mining and drilling, and recreational interests have played a role in the reduction of fluvial habitat.

3.19.2.1. Waters with Fisheries Resources

3.19.2.1.1. Distribution

The majority of the Pinedale RMPPA lies within the Upper Green River and New Fork River watersheds in the Green River Basin of the Upper Colorado hydrologic region. Additional portions of the area lie within the Big Sandy and Slate watersheds, also part of the Green River Basin and the Upper Colorado hydrologic region. Watershed boundaries are illustrated and tabulated in Section 3.17 (Watershed and Water Quality).

Approximately 300 miles (480 kilometers [km]) of stream and riverine habitat and 2,500 acres of lake and reservoir habitat support fish populations in the Pinedale RMPPA. Fisheries within the area consist of both native and non-native game and non-game species. Several listed species or species of concern also are found within the area. Native fishes within the Pinedale RMPPA have been greatly impacted by previous management actions. In September 1962, approximately 445 miles (715 km) of the Green River and tributaries above Flaming Gorge Dam were poisoned with rotenone. This effort to control "rough fish" for game fish enhancement effectively killed all native fishes above the dam.

3.19.2.1.2. Productivity and Use of Fisheries

The Wyoming Game and Fish Department classifies streams within the Green River Basin and Pinedale RMPPA according to the relative productivity of each reach's trout fishery (States West 2000). The following five classifications are used to describe the quality of each river reach that has been assessed:

- Class 1 – "Blue Waters"; Premium trout waters and fisheries of national importance
- Class 2 – "Red Waters"; Very good trout waters and fisheries of statewide importance
- Class 3 – "Yellow Waters"; Important trout waters and fisheries of regional importance
- Class 4 – "Brown Waters"; Low production waters, trout fisheries are locally important but cannot support heavy fishing pressure
- Class 5 – No color designation; waters with very low productivity and generally incapable of sustaining trout fisheries.

Within the Pinedale RMPPA, no reaches are classified as Class 1. However, four reaches, three on the Green River above Fontenelle Reservoir and one on the New Fork River near Boulder, have been identified as Class 2. The remainder of the area stream and river reaches have been classified as Class 3 or Class 4 waters, with some waters having no classification.

In 1988, supply and demand for fisheries resources in the Green River Basin above Flaming Gorge Reservoir indicated that total fishing demand was approximately 51 percent of the total supply for lakes and reservoirs in the basin (States West 2000). However, streams and rivers in the basin had approximately 91 percent utilization while standing water had only 36 percent utilization.

Annual angler effort for standing water types (ponds, lakes, and reservoirs) within the Pinedale portion of the Green River Basin was estimated as 85,097 angler days by the Wyoming Game and Fish Department (States West 2000). Of this angler effort, 90 percent was in natural alpine (70 percent of total) and lowland lakes (20 percent of total). The remaining 10 percent of the angler effort was for alpine reservoirs (9 percent of total), lowland reservoirs (<1 percent), and trout farm ponds (<1 percent).

Annual angler effort for streams and rivers was not separated for the Pinedale portion. However, for the Green River Basin above Flaming Gorge Reservoir, angler effort has decreased over the past 20 years (States West 2000). In 1979, there were 326,800 estimated angler days in the basin. In 1991, that number had dropped to 256,300 estimated angler days (a decrease of nearly 22 percent).

3.19.2.1.3. Water Quality

The majority of the waters in the Pinedale RMPPA are listed as Class 2AB waters by the Wyoming Department of Environmental Quality (DEQ), Water Quality Division (DEQ 2001a). Class 2AB waters are defined as:

> "...those known to support game fish populations or spawning and nursery areas at least seasonally and all their perennial tributaries and adjacent wetlands and where a game fishery and drinking water use is otherwise attainable..." (DEQ 2001a).

Additional protections of Class 2AB waters include "...nongame fisheries, fish consumption, aquatic life other than fish, primary contact recreation, wildlife, industry, agriculture and scenic values" (DEQ 2001a).

Other water quality designations within the Pinedale RMPPA include Class 1 and Class 3B waters. Class 1 waters are defined as "Outstanding Waters" (DEQ 2001b). This designation is made for all waters for which water quality degradation, other than that originating from dam discharges, is not allowed. Class 3B waters include tributaries that are not known to support fisheries or drinking water supplies. They are typically intermittent or ephemeral in nature but have the hydrologic conditions necessary to support invertebrate populations, amphibians, and obligate or facultative wetland plant species.

3.19.2.2. Game Species

Game fish found within the Pinedale RMPPA primarily consist of non-native species. However, several native salmonid species do exist within the Green River and Snake River drainages. The Colorado River cutthroat trout and the mountain whitefish (*Prosopium williamsoni*) are both native to the Green River, although they are widely distributed elsewhere throughout much of their historic range. The Snake River fine-spotted cutthroat trout (*Oncorhynchus clarki* ssp.) is native to the headwaters of the Snake River drainage and has been introduced to areas of the Pinedale RMPPA. A similar species to the Snake River fine-spotted cutthroat trout, the Yellowstone cutthroat trout (*Oncorhynchus clarki bouvieri*), has also been introduced to the area. Additional game fish in the area include other introduced salmonids such as the rainbow, brook, and brown trouts (*Oncorhyncus mykiss*, *Salvelinus fontinalis*, and *Salmo trutta*, respectively).

3.19.2.3. Non-Game Species

The majority of fish species in the Pinedale RMPPA are native and non-native, non-game species, including mottled sculpin (*Cottus bairdi*), five species of suckers (*Catostomidae*), redside shiners (*Richardsonius balteatus*), three species of dace, carp, and several species of chub (*Cyprinidae*). Distribution and abundance of these species varies throughout the area. Generally, these species occupy the same water bodies as the game species.

3.19.2.4. Special Status Species

3.19.2.4.1. Federally-Listed Species

The USFWS listed the Kendall Warm Springs dace (*Rhinichthys osculus thermalis*) as endangered on October 13, 1990 (Federal Register 35 FR 16047 16048). The species is also listed as a species of special concern by the State of Wyoming. The species is not known to exist on BLM-administered lands in the Pinedale RMPPA. However, it does exist in public lands adjacent to lands of the area, so it was listed in this section. The species is endemic to approximately 300 meters of Kendall Warm Springs, a small tributary to the Green River in the Bridger-Teton National Forest near the town of Pinedale. It is the only known species in Kendall Warm Springs.

Waters in the springs are slightly alkaline, mineralized, and are high in total dissolved solids. Constant water temperatures between 26 and 29 degrees Celsius (°C) are found in the springs year-round (Virginia Tech 2002). Average streamflow in the springs is approximately 7 cubic feet per second (cfs) and channel gradient is approximately 4 percent. The stream draining the various springs is approximately 6 feet wide and 1 foot deep. Dissolved oxygen levels are low at the source of the springs and increases as water flows downstream. The abundance of dace populations appears to be correlated with the dissolved oxygen levels with fewer individuals observed near the source of the spring. The springs are isolated from the Green River population by thermal and travertine barriers. The population is currently stable and is located entirely on public Forest Service lands. A culvert divides the population into two separate communities.

Population size of the species is uncertain. However, the population is effectively managed and is currently stable. Threats that have been identified for the conservation of the Kendall Warm Springs dace include historic use of the springs for bathing and clothes washing purposes (these uses have been prohibited by the Forest Service), grazing and bank destabilization, and use of the dace for fishing bait.

The Kendall Warms Springs dace is similar to Green River specked dace (*Rhinichthys osculus yarrowi*) but has a larger head and fins, smaller body size, fewer scales, and fewer fin rays. Adults are 23 to 54 millimeters (mm) in length. The species tends to congregate in small schools (Matthews and Mosely 1990). Primary sources of mortality for the species are dragonfly predation and downstream transport of individuals over the travertine barrier and into the Green River (Gryska and Hubert 1997). Adult dace are found in low velocity pools and eddies containing aquatic vegetation that provides escape and feeding cover. Juveniles and fry occupy still water areas and areas with dense vegetation. Spawning appears to occur throughout the year (Matthews and Mosely 1990; Gryska and Hubert 1997). During spawning, males turn bright purple while females have olive coloring (USFWS 1982). The species eats small invertebrates, including dipterans and mollusks (Gryska and Hubert 1997).

3.19.2.4.2 Other Special Status Species

- Roundtail Chub - The roundtail chub (*Gila robusta robusta)* is listed as a BLM sensitive species in Wyoming (BLM 2001). The species ranges throughout the upper Colorado River Basin, historically from the mainstem Colorado River upstream of the Grand Canyon and into its tributaries in the Gila and Green River Basins (Lee et al. 1980). Roundtail chub with adjunct distributions outside of the Colorado River Basin are classified as three subspecies distinct from *G. r. robusta*, and occur in the Pluvial White River (Nevada), the Virgin River (Utah, Arizona, and Nevada), and in the Rio Yaqui Basin of Mexico (Lee et al. 1980). Declines in abundance throughout the roundtail chub's range have been attributed mainly to the many forms of habitat degradation that followed the construction of dams throughout the Colorado River Basin, such as disruption of the natural flow regime, changes in the temperature and turbidity regimes, and channelization. In particular, the loss of natural flooding seems to limit roundtail chub recruitment (Brouder 2001), and low temperatures below reservoirs exclude roundtail chub from tailwater reaches (Vanicek et al. 1970). Declines in roundtail chub populations within the Pinedale RMPPA can be partially attributed to September 1962, when 715 km of the Green River and tributaries above Flaming Gorge Dam were poisoned with rotenone. Recovery of roundtail chub in this region has probably been hampered by the invasion of non-native fish species following the poisoning (Holden 1991). Within the Pinedale RMPPA, roundtail chub distribution is not well documented. Suitable habitat likely exists from above Fontenelle Reservoir to Pinedale. Once the Green River enters mountainous regions where temperatures drop, habitat likely becomes unsuitable for roundtail chub. Surveys are needed to determine the present distribution of roundtail chub in the study area.

- Leatherside Chub - The leatherside chub (*Gila copei*) is a BLM sensitive species in Wyoming (BLM 2001). According to Johnson et al. (1995), the leatherside chub was once a candidate for Federal protection under the *Endangered Species Act*; however, at present, the species has no Federal status. The leatherside chub is native to the southern and eastern Bonneville Basin (including Salt Lake and Provo Lake drainages) and upper Snake River above Shoshone Falls (Utah, Idaho, and Wyoming) and the Wood River drainage in Idaho. It has also been introduced into the Green River in Utah (Lee et al. 1980). This species has experienced declines and local extirpations in various parts of its range. Reasons for decline include impoundments, dewatering, siltation, and predation by introduced brown trout (Walser et al. 1999). The leatherside chub is not native to the Green River, so any leatherside chub found within the Pinedale RMPPA would constitute an introduced population. Although documented occurrences of leatherside chub in the Green River are restricted to Utah (Lee et al. 1980), the prevalence of use of this species as a bait fish indicates that leatherside chub certainly could be in the upper Green River in Wyoming. Surveys are needed to determine whether this species occurs within the area.

- Flannelmouth Sucker - The flannelmouth sucker (*Catostomus latipinnis*) is listed as a BLM sensitive species in Wyoming (BLM 2001). Its native range spans the entire Colorado River Basin, including the Green, Yampa, Gunnison, and San Juan Rivers, the Little Colorado River, the Gila River Basin, and the mainstream Colorado River (Lee et al. 1980). The flannelmouth sucker remains fairly abundant throughout the Colorado River Basin, in contrast to many native fishes in the region. However, dispersal is an important component of this species' life history, and aggregations of adults below dams during spawning season suggest that impoundments may be disrupting spawning migrations (Chart and Bergersen 1992; McKinney et al. 1999). Furthermore, evidence of hybridization between flannelmouth sucker and the introduced white sucker (*C. commersoni*) in the upper Colorado River Basin (Holden and Stalnaker 1975, Valdez 2002) indicates another potential threat to the integrity and persistence of this species. Within the Pinedale RMPPA, flannelmouth sucker populations were eliminated in 1962 when the entire Green River and its tributaries upstream of Flaming Gorge Dam were poisoned with rotenone (Holden 1991). Although the species has since recolonized the region above the dam, the potentially harmful effects to this population have not been assessed. Following its extermination upstream of the Flaming Gorge Dam in 1962, the flannelmouth sucker became reestablished in the upper Green River and is likely found in the large to moderate stretches of river within the Pinedale RMPPA. However, the exact limits of its distribution upstream of Fontenelle Reservoir are not currently known.

- Bluehead Sucker - The bluehead sucker (*Catostomus discobolus*) is listed as a BLM sensitive species in Wyoming. This species has an interesting distribution, occurring in the Colorado River from the Grand Canyon on up into its tributaries including the Green, Yampa, Gunnison, and San Juan Rivers, but absent from the Colorado River below Grand Canyon, including the Gila River Basin. The bluehead sucker is also native to the Bear and Weber River drainages and the Snake River upstream of Shoshone Falls (Lee et al. 1980). Declines in abundance of this species have not been well documented, but potential threats include habitat degradation resulting from impoundment and dewatering. The presence of dams throughout the bluehead sucker's range may interfere with migrations. Holden and Stalnaker (1975) collected both white sucker (*C. commersoni*) and longnose sucker (*C. catostomus*) in the upper Colorado River Basin; competitive interactions with these two introduced species could also harm the bluehead sucker. Hybridization with flannelmouth and white suckers may also be threatening the integrity of this species in the upper Colorado River Basin (Holden and Stalnaker 1975). Populations of bluehead sucker within the Pinedale RMPPA were exterminated in 1962, when the upper Green River and its tributaries above the Flaming Gorge Dam were poisoned with rotenone (Holden 1991). After the poisoning, the bluehead sucker was found to be one of the dominant species below the Flaming Gorge Dam (Holden and Stalnaker 1975), and the species has recolonized the region upstream of the dam. Given its wide tolerance of habitat types, it is likely that this species occurs throughout the area. However, surveys are needed to determine whether interactions with non-native suckers have restricted its distribution within the upper Green River.

- Yellowstone Cutthroat Trout - The Yellowstone cutthroat trout (*Oncorhynchus clarki bouvieri*) is distinguished from other trout species by its two prominent red slashes on the lower jaw, and from other cutthroat trout subspecies by medium to large, pronounced, outlined spots. Spots are concentrated on the caudal peduncle, except in Yellowstone Lake fish, which have spots that are evenly distributed over both sides of the body. Coloration is a dull yellowish brown, silvery, or brassy. Bright golden-yellow, orange, or red colors are typically absent. Rose tints may appear on the body of mature fish (Behnke 1992, Baxter and Stone 1995). The Yellowstone cutthroat trout is endemic to part of the Snake River Basin, but moved naturally into the Yellowstone River drainage (Missouri River system) via Two Ocean Pass. In this area, Pacific Creek drains into the Snake River system and Atlantic Creek drains into the Yellowstone system. Fish movement can still occur between these two streams (Behnke 1992). The distribution of Yellowstone cutthroat trout is now limited to the Snake River above Shoshone Falls and to the Yellowstone River drainage downstream of the Tongue River. Above Shoshone Falls, the Yellowstone cutthroat trout is native to all the Snake River system except for waters between Jackson Lake and Palisades Reservoir, where the fine spotted Snake River cutthroat (*Oncorhynchus clarki* spp.) exists. Yellowstone cutthroat trout exist today in Pacific Creek, which joins the Snake River just blow Jackson Lake. Approximately 65 percent of the historical range of the Yellowstone cutthroat was in northwestern Wyoming. Any current populations in the Pinedale RMPPA are likely introduced.

Yellowstone and other cutthroat species hold one advantage over competitors in their apparent physiological tolerance for higher elevations and colder temperatures, which has given them a slight advantage in headwater tributaries (Kruse et al. 2000). However, these headwater populations are susceptible to stochastic events, limiting population size, stability, and sustainability (Bozek and Hubert 1992). While the competitive mechanisms are poorly understood, it is generally suspected that in many circumstances non-native salmonids will replace cutthroat trout over time (Fausch 1988, DeStaso and Rahel 1994). Additionally, cutthroat are susceptible to water quality perturbations that may be caused by irrigation, logging, mining, or overgrazing such as turbidity, contaminants, or changes in water temperature (Gresswell 1995). Whirling disease, transferred through *Myxobolus cerebralis*, is also a threat to Yellowstone cutthroat trout populations. Positive results have confirmed whirling disease infections in Yellowstone Lake (Mahoney nd). At this time the impact that the disease may have on the Yellowstone cutthroat trout populations in Wyoming is unclear. It is also unclear how this disease will impact trout in the area. Yellowstone cutthroats are listed as sensitive species by the Forest Service Region 2 and the Wyoming BLM. It has been given special consideration by the state agencies of Wyoming and Montana.

- Fine Spotted Snake River Cutthroat Trout - The fine spotted Snake River cutthroat (*Oncorhynchus clarki subsp.*) is distinguished by its fine, pepper-like spots. It is predominantly yellowish brown, sometimes with purple and silvery tones. Faint rose tints may appear on mature fish, and the lower fins typically are orange or red. The greatest concentration of the spots on the body is towards the caudal peduncle and above the lateral line anterior to the dorsal fin (Behnke 1992). Behnke found the marked difference in spotting between the Yellowstone and the Snake River cutthroats to be the only consistent difference between the two fish. The relationship between Yellowstone cutthroat trout and the fine spotted Snake River cutthroat trout is uncertain. They both occur in the Snake River drainage; however, very little hybridization has been recorded. Genetic analysis could not distinguish these subspecies until recently (Kruse 1995). Bonneville cutthroat trout (*Oncorhynchus clarki utah*) are also closely related and can be very similar in appearance.

  Snake River cutthroat prefer spring streams and the cool, clear, upper reaches of the Snake River. The present known distribution of the fine spotted Snake River cutthroat trout in its native range includes the Snake River drainage from below Jackson Lake downstream to Palisades Reservoir, encompassing all tributaries from the Gros Ventre River to the Salt River. The subspecies has proven to be a highly adaptable fish and have become important to many state fisheries stocking programs. It is likely introduced in the Pinedale RMPPA. The Snake River cutthroat has been listed as a sensitive species in its native range by the Forest Service Region 4 and the Wyoming BLM. It has been given special consideration by the state agencies of Wyoming and Idaho.

- Colorado River Cutthroat Trout - Colorado River cutthroat (*Oncorhynchus clarki pleuriticus*) is the only native Colorado River trout and one of only two native salmonids (the other being the mountain whitefish). Colorado River cutthroat develop brilliant red, orange, and golden-yellow coloration, especially during spawning. The Colorado River cutthroat was once common in the upper Green River and Colorado River watersheds, but it currently occupies less than 1 percent of its former range. It exists in isolated sub-drainages in Colorado, Utah, and Wyoming (Behnke 1992, Young 1995). Colorado River cutthroat trout occur in two drainages within the Green River and Little Snake River drainage in Wyoming. The North Fork of the Little Snake River contains the largest population of the subspecies in Wyoming (Binns 1977). In the Green River drainage, Colorado River cutthroat trout are restricted to areas above upstream migration barriers, populations are disjunct, and displacement by non-native salmonids has occurred (Bozek and Rahel 1991). The Little Snake drainage is protected by a constructed migration barrier; consequently, Colorado River cutthroat are found throughout 28 km of streams in the drainage.

Pure populations of Colorado River cutthroat have been extirpated from most of the historical range. They have been listed as a subspecies of "special concern" by the American Fisheries Society, a Category 2 species by the U.S. Fish and Wildlife Service, and a sensitive species by the Forest Service Regions 2 and 4. Wyoming BLM lists it as a sensitive species and it has been given special consideration by the state agencies of Colorado, Utah, and Wyoming. A petition to list the Colorado River cutthroat as endangered or threatened was filed with the Secretary of Interior. To date, the U.S. Fish and Wildlife Service has not listed the subspecies. Threats to the Colorado River cutthroat include continued hydromodifications and habitat fragmentation throughout its historic range; competition with non-native salmonids; whirling disease; continued development of oil, gas, and mineral leases; grazing impacts; and a number of other natural and manmade threats.

3.20. SPECIAL MANAGEMENT AREAS

3.20.1. AREAS OF CRITICAL ENVIRONMENTAL CONCERN

Areas of environmental concern (ACECs) are areas that contain one or more resource that requires special management and protection to maintain the value of the resource and the area. Areas designated as ACECs may contain such resources as rare or sensitive archaeological resources; habitat for endangered, sensitive, or threatened species; or rare geologic features. This section discusses the ACEC designations that are managed by the BLM's Pinedale RMPPA.

ACEC designations indicate areas for which special management attention is necessary to protect and prevent irreparable damage to important historic, cultural, and scenic values; fish, wildlife resources, or other natural systems or processes; or to protect human life and safety from natural hazards. Management is considered special if it is unique to the area and includes terms and conditions specifically designed to protect the values within the ACEC.

The BLM recognizes that an ACEC has significant values and establishes special management measures to protect those values. The designation is a reminder that significant values exist that must be accommodated when future management actions and land use proposals are considered within the ACEC. Designation may also support a funding priority. The designation of ACECs is only achieved through the resources management planning process, either in the RMP itself or in a plan amendment.

Two ACECs are included in the existing Pinedale Field Office RMP:

- Rock Creek - The objective for managing the 5,264-acre Rock Creek ACEC is the protection of the Rock Creek drainage, thereby assuring quality aquatic habitat for the sensitive Colorado River cutthroat trout (Oncorhyncus clarki pleuriticus) and providing crucial winter range for a portion of the Piney elk herd. Rock Creek was designated as an ACEC during the 1988 RMP planning process
- Beaver Creek - The objectives for managing the approximately 3,548-acre Beaver Creek ACEC are to assure quality aquatic habitat for the sensitive Colorado River cutthroat trout and to protect elk calving habitat. Beaver Creek was designated as an ACEC during the 1988 RMP planning process.

Both ACECs are located along the western portion of the Pinedale RMPPA, as shown in Figure 3.20-1.

3.20.2. SPECIAL RECREATION MANAGEMENT AREAS

The basic units of recreational management are either the Special Recreation Management Area (SRMA) or the Extensive Recreation Management Area (ERMA). The SRMA is an area with a commitment to provide specific recreational activities and opportunities. These areas usually require a high level of recreational management. The ERMA is an area where recreation management is one of several management objectives and consists of the remainder of land not included in SRMAs. These areas may include developed and primitive recreation sites with minimal facilities. The SRMAs in Pinedale RMPPA include: 1) Scab Creek; 2) Boulder Lake; and 3) Upper Green River (Figure 3.20-1). The SRMAs are summarized below.

- Scab Creek SRMA - The Scab Creek SRMA is located on the eastern boundary of the RMPPA, along the lower slopes of the Wind River Range and adjacent to the Bridger Wilderness Area. This area provides a wide range of recreational uses including camping, horseback riding, rock climbing, hunting, and fishing. The area is being managed as a proposed wilderness area, but facilities such as horse corrals, camping areas, trailhead parking areas, and fire rings are provided. The Scab Creek SRMA is heavily used by the public throughout the year
- Boulder Lake SRMA - Boulder Lake SRMA comprises approximately 1,840 acres, and encompasses approximately 3 miles of the shoreline of Boulder Lake and the surrounding area. The SRMA is located approximately 8 miles north of the town of Boulder, and provides two campgrounds located on the north and south sides of the lake. The area is heavily used during the summer and fall, and is a popular destination for boaters, fishermen, and campers
- Upper Green and New Fork Rivers SRMA - These two areas comprise the most heavily used SRMA in the Pinedale RMPPA, but receive the least management. The

most heavily developed area is the 12-mile stretch of river referred to as the Upper Green. This SRMA provides 12 semi-developed river access points and picnicking facilities located along a maintained dead end road. Located at the northern end of the Pinedale RMPPA, the Upper Green SRMA provides river fishing access, and river floating and float fishing access.

3.20.3. WILD AND SCENIC RIVERS

The Wild and Scenic Rivers Act of 1968 (WSRA) was developed to protect outstanding scenic, recreational, geologic, fish and wildlife, historic, cultural, or other values of a river or section of river, and to preserve a river or river section in its free-flowing condition. The WSRA recognizes three classes of rivers: Wild, Scenic, and Recreational. The BLM is required to identify and evaluate all rivers, as defined by the WSRA, located on land under its administration, and to determine if the rivers are appropriate for addition to the National Wild and Scenic Rivers System (NWSRS).

The 1996 Green River Resource Area Resource Management Plan, administered by the BLM, studied a number of river segments in the Green River Basin for possible designation under the Wild and Scenic Rivers Act. Initially, 183 waterways or waterway segments were reviewed for eligibility. Of these, 175 were found "…not to have any outstandingly remarkable values and were dropped from further consideration."

The remaining eight waterways under consideration included the Red Creek Unit, Currant Creek Unit, Pacific Creek, North Fork of Bear Creek, Canyon Creek, and the Green and Big Sandy Rivers. These were reviewed for suitability for classification under the system. However, no segments in the Green River Basin were ultimately determined suitable for inclusion. The primary reasons given for the "Not Suitable" determination included landowner conflicts, inability to manage the segment, lack of interest for designation, and potential use conflicts (States West 2001).

Therefore, no rivers within the Pinedale RMPPA have been designated Wild, Scenic, or Recreational in accordance with the WSRA. However, a new inventory is currently underway to identify waterway reaches that are eligible for addition to the NWSRS and that flow through lands administered by the field office. At this time, the results of this inventory are not finalized.

3.20.4. WILDERNESS STUDY AREAS AND WILDERNESS

In 1964, Congress passed the Wilderness Act, thereby establishing a national system of lands for the purpose of preserving a representative sample of ecosystems in a natural condition for the benefit of future generations. Until 1976, most land considered for and designated as wilderness was managed by the Forest Service and National Park Service. With the passage of the Federal Land Policy and Management Act (FLPMA) in 1976, Congress directed the BLM to inventory, study, and recommend which public lands under its administration should be designated wilderness.

The Rock Springs Field Office inventoried over 5.8 million acres of public land in southwestern Wyoming in 1978, including BLM-administered land in Sublette and Lincoln Counties, to identify areas that possess wilderness characteristics. For the next several years, these areas were studied to determine which could be recommended to Congress for designation as wilderness. In August 1990, the BLM released the Final Environmental Impact Statement (EIS) for that wilderness inventory, finding 6 of 13 areas analyzed suitable and eligible for wilderness designation.

In the interim between the inventory that identifies suitable and eligible areas appropriate for wilderness designation and the actual Congressional designation of a wilderness, the BLM must manage the potential wilderness. The BLM manages these potential wilderness areas as Wilderness Study Areas (WSAs) (BLM 1990). During the time that Congress considers an area for wilderness, which can be many years, designated WSAs require special management practices to preserve the wilderness characteristics that make an area appropriate for designation.

WSAs, established under the authority of Section 603(c) of FLPMA, are managed to preserve their wilderness values according to the Interim Management Policy (IMP), and will continue to be managed in that manner until Congress either designates them wilderness or releases them for other uses. Only Congress can designated or release Section 603 WSAs, and their status will not change as a result of the Pinedale Field Office planning process.

Potential wilderness can be identified through the BLM, or identified through external nominations by the public. Both methods require the same type of review to determine if the area has wilderness values, and if the area is manageable as wilderness.

Currently, two WSAs are identified in the Pinedale RMPPA: Scab Creek WSA, which is comprised of 7,636 acres; and Lake Mountain WSA, which is comprised of 13,970 acres. These areas are illustrated on Figure 3.20-2. The final document for each area (Final Scab Creek Wilderness Study Report [BLM 1981; Final Rock Springs Wilderness Environmental Impact Statement [BLM 1990]) have been used in the Pinedale Field Office to guide the determination of areas that are suitable for WSA designation. A summary of each WSA follows:

- Scab Creek WSA - This area was originally established and managed as a primitive area in 1975. In April 1985, the Scab Creek Instant Study Area was proposed by former president Ronald Reagan for addition to the National Wilderness Preservation System. The Scab Creek WSA adjoins the Bridger Wilderness in Bridger National Forest, which lies to the east. Scab Creek WSA offers extraordinary natural wilderness features, as well as ample opportunity for solitary wilderness experiences.
- Lake Mountain WSA - Lake Mountain WSA contains important elk winter range, as well as Colorado River cutthroat trout (*Oncorhyncus clarki pleuriticus*) habitat. Lake Mountain WSA was determined to be difficult to manage as wilderness and, therefore, was not recommended for designation as wilderness in the Final Rock Springs Wilderness EIS (BLM 1990). Nonetheless, the BLM must manage the area as a WSA until such time Congress does or does not designate it as wilderness.

In accordance with the BLM policy outlined in Manual Handbook H-6310-1, an interdisciplinary team of BLM specialists evaluates each public proposal for wilderness to determine: 1) if it was new and significantly different from information considered in prior wilderness inventories conducted by the BLM; and 2) whether there was a reasonable probability that the areas (or significant portions thereof) may have wilderness character. From that evaluation, the BLM determines which areas have wilderness character. These areas are then analyzed through a resource management plan or supplemental plan to determine if they are eligible for wilderness designation; during this time, the areas are managed as WSAs. Currently, there are no externally-generated wilderness proposal areas within the Pinedale RMPPA.

There is no designated wilderness within the Pinedale RMP plan area.

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Table 3.1-1. National and Wyoming Air Quality Standards.

Pollutant	**Averaging Time**	**NAAQS ($\mu g/m^3$)**	**WAAQS ($\mu g/m^3$)**
Carbon Monoxide—CO	1 hour	40,000	40,000
	8 hour	10,000	10,000
Nitrogen Dioxide—NO_2	Annual	100	100
Sulfur Dioxide—SO_2	3 hour	1300	695
	24 hour	365	260
	Annual	80	60
Ozone—O_3	1 hour	235	235
	8 hour	157	157
Particulate Matter—PM10	24 hour	150	150
	Annual	50	50
Fine Particulate Matter—PM2.5	24 hour	65	65
	Annual	15	15

P-Table 3.1-1 National Air Quality Standards

Table 3.1-2. PSD Increments.

Pollutant	Averaging Time	PSD Increment ($\mu g/m^3$)	
		Class I	Class II
Nitrogen Dioxide—NO_2	Annual	2.5	25
Sulfur Dioxide—SO_2	3 hour	25	512
	24 hour	5	91
	Annual	2	20
Particulate Matter—PM_{10}	24 hour	8	30
	Annual	4	17

Table 3.1-3. Concentrations of Criteria Air Pollutants.

Pollutant	Averaging Time	Monitored Concentration ($\mu g/m^3$)	Percent NAAQS (%)	Percent WAAQS (%)
Carbon Monoxide CO	8 hour	1500	15	15
	1 hour	3500	9	9
Nitrogen Dioxide NO_2	Annual	9	9	9
Sulfur Dioxide SO_2	Annual	9	11	15
	24 hour	43	12	17
	3 hour	132	10	19
Ozone O_3	8 hour	139	89	89
	1 hour	144	61	61
Particulate Matter PM_{10}	Annual	12	24	24
	24 hour	20	13	13
Fine Particulate Matter $PM_{2.5}$	Annual	6	40	40
	24 hour	10	15	14

Table 3.1-4. Summary of Air Quality in the Vicinity of the Pinedale RMPPA.

Air Quality Component	**Comment**
Air Pollutant Concentrations	
Criteria Air Pollutants	Concentrations are in compliance with NAAQS and WAAQS.
Nitrogen Compounds	• Nitric acid (HNO_3) concentrations in Pinedale are slightly higher than concentrations in other remote areas. Nitric acid concentrations in Yellowstone National Park are consistent with other remote areas. • Concentrations of nitrate (NO3) and ammonium (NH4) in Pinedale and Yellowstone National Park are consistent with other remote areas
Sulfur Compounds	• Sulfur dioxide (SO_2) concentrations in Pinedale are well below concentrations typical in remote areas. Sulfur dioxide concentrations in Yellowstone National Park are consistent with other remote areas. • Sulfate (SO_4^{--}) concentrations in Pinedale and Yellowstone National Park are consistent with concentrations in remote areas
Visibility	
Bridger Wilderness	• 10% cleanest: 145-180 miles • average: 90-120 miles • 10% haziest: 60-90 miles
Atmospheric Deposition	
Precipitation pH	• Slight precipitation acidification in Pinedale from 1994 through 1998 (pH as low as 4.9) • Precipitation near-natural in Yellowstone National Park from 1980 through 2000 (pH: 5.1 – 5.7)
Total Deposition	• Pinedale: nitrogen deposition from ammonium (NH_4^+) and nitrate ($NO3^-$) is less than 2.6 kg/ha.[1] Sulfur deposition from sulfate ($SO4^{--}$) and sulfur dioxide (SO_2) is less than 1.7 kg/ha.[2] • Yellowstone National Park: nitrogen deposition from ammonium (NH_4^+) and nitrate ($NO3^-$) is less than 2.5 kg/ha.[1] Sulfur deposition from sulfate ($SO4^{--}$) and sulfur dioxide (SO2) is less than 2.2 kg/ha.[2]

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[1] Proposed acceptable level of total nitrogen deposition is 3 to 5 kg/ha/year (USFS, 1989)

[2] Proposed acceptable sulfur deposition is 5 kg/ha/year (USFS, 1989)

Table 3.1-4. Summary of Air Quality in the Vicinity of the Pinedale RMPPA.

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[1] Proposed acceptable level of total nitrogen deposition is 3 to 5 kg/ha/year (USFS, 1989)

[2] Proposed acceptable sulfur deposition is 5 kg/ha/year (USFS, 1989)

Table 3.6-1. List of Hazardous Constituents Potentially Used or Produced During Construction, Drilling, Production, and Reclamation Operations Associated with Coalbed Methane and Natural Gas

Use	Material	Hazardous Constituents
Drilling Material	Barite	Barium compounds, Fine mineral fibers
	Bentonite	Fine mineral fibers
	Caustic Soda	Sodium hydroxide
	Glutaraldehyde	Isopropyl alcohol
	Lime	Calcium hydroxide
	Mica	Fine material fibers
	Modified Tannin	Ferrous sulfate, Fine material fibers
	Phosphate Esters	Methanol
	Polyacrylamides	Acrylamide, Polycyclic aromatic hydrocarbons (PAHs), Petroleum distillates, Polycyclic organic matter (POM), Fine mineral fibers
	Retarders	Fine mineral fibers
	Anionic Polyacrylamide	Acrylamide
	Polyanionic Cellulose	Fine mineral fibers
Cement/Plug	Anti-foamer	Glycol ethers
	Bentonite	Fine mineral fibers
	Calcium Chloride Flake	Fine mineral fibers
	Cellophane Flake	Fine mineral fibers
	Cements	Aluminum oxide, Fine mineral fibers
	Chemical Wash	Ammonium oxide, Glycol ethers
	Diatomaceous Earth	Fine mineral fibers
	Extenders	Aluminum oxide, Fine mineral fibers
	Fluid Loss Additive	Acrylamide, Fine mineral fibers, Naphthalene
	Friction Reducer	Fine mineral fibers, Naphthalene, PAHs, POM
	Mud Flash	Fine mineral fibers
	Retarder	Fine mineral fibers
	Salt	Fine mineral fibers
	Silica Flour	Fine mineral fibers
Fracturing Material	Biocides	Fine mineral fibers, PAHs, POM
	Breakers	Ammonium persulphate, Ammonium sulphate, Copper compounds, Ethylene glycol, Fine mineral fibers, Glycol ethers
	Clay Stabilizer	Fine mineral fibers, Glycol ethers, Isopropyl alcohol, Methanol, PAHs, POM
	Crosslinkers	Ammonium chloride, Methanol, Potassium hydroxide, Zirconium nitrate, Zirconium sulfate
	Foaming Agent	Glycol ethers
	Gelling Agent	Benzene, Ethylbenzene, Methyl tert-butyl ether (MTBE), Naphthalene, PAHs, POM, Sodium hydroxide, m-Xylene, o-Xylene, p-Xylene
	pH Buffers	Acetic acid, Benzoic acid, Fumeric acid, Hydrochloric acid, Sodium hydroxide
	Sands	Fine mineral fibers
	Solvents	Glycol ethers
	Surfactants	Glycol ethers, Isopropyl alcohol, Methanol, PAHs, POM
Production Product/Fuel	Natural Gas	n-Hexane, PAHs, POM

Table 3.6-1. List of Hazardous Constituents Potentially Used or Produced During Construction, Drilling, Production, and Reclamation Operations Associated with Coalbed Methane and Natural Gas (continued)

Production Product	Produced water/drill cuttings	Barium, Cadmium, Chromium, Lead, Manganese, Radium 226, Uranium, Other radionuclides
	Liquid hydrocarbons	Benzene, Ethyl benzene, n-Hexane, PAHs, POM, Toluene, m-Xylene, o-Xylene, p-Xylene
Fuel	Diesel fuel	Benzene, Cumene, Ethylbenzene, MTBE, Naphthalene, PAHs, POM, Toluene, m-Xylene, o-Xylene, p-Xylene
	Gasoline	Benzene, Cumene, Cyclohexane, Ethylbenzene, n-Hexane, MTBE, Naphthalene, PAHs, POM, Tetraethyl lead, Toluene, m-Xylene, o-Xylene, p-Xylene
	Jet A	Benzene, Cumene, Cyclohexane, Ethylbenzene, n-Hexane, MTBE, Naphthalene, PAHs, POM, Toluene, m-Xylene, o-Xylene, p-Xylene
	Propane	Propylene
Geophysical Survey Materials	Explosives, fuses, detonators, boosters, fuels	Aluminum, Ammonium nitrate, Benzene, Cumene, Ethylbenzene, Ethylene glycol, Lead compounds, MTBE, Naphthalene, Nitric acid, Nitroglycerine, PAHs, POM, Toluene, m-Xylene, o-Xylene, p-Xylene
Pipeline Material	Coating	Aluminum oxide
	Cupric sulfate solution	Cupric sulfate, Sulfuric acid
	Diethanolamine	Diethanolamine
	LP Gas	Benzene, n-Hexane, Propylene
	Molecular sieves	Aluminum oxide
	Pipeline primer	Naphthalene, toluene
	Potassium hydroxide solution	Potassium hydroxide
	Rubber resin coatings	Acetone, Coal tar pitch, Ethyl acetate, Methyl ethyl ketone (MEK), Toluene, Xylene
Emissions	Gases	Formaldehyde, Nitrogen dioxide, Ozone, Sulfur dioxide, Sulfur trioxide
	Hydrocarbons	Benzene, Ethylbenzene, n-Hexane, PAHs, Toluene, m-Xylene, o-Xylene, p-Xylene
	Particulate Matter	Barium, Cadmium, Copper, Fine mineral fibers, Lead, Manganese, Nickel, POM, Zinc

Table 3.6-1. List of Hazardous Constituents Potentially Used or Produced During Construction, Drilling, Production, and Reclamation Operations Associated with Coalbed Methane and Natural Gas (continued)

Miscellaneous	Acids	Acetic anhydride, Formic acid, Sodium chromate, Sulfuric acid
	Antifreeze, Heat Control, and Dehydration Agents	Acrolein, Cupric sulfate, Ethylene glycol, Freon, Phosphoric acid, Potassium hydroxide, Sodium hydroxide, Triethylene glycol
	Batteries	Cadmium, Cadmium oxide, Lead, Nickel hydroxide, Potassium hydroxide, Sulfuric acid
	Biocides	Formaldehyde, Isopropyl alcohol, Methanol
	Cleaners	Hydrochloric acid
	Corrosion Inhibitors	4-4' Methylene dianiline, Acetic acid, Ammonium bisulfite, Basic zinc carbonate, Diethylamine, Dodecylbenzenesulfonic acid, Ethylene glycol, Isobutyl alcohol, Isopropyl alcohol, Methanol, Naphthalene, Sodium nitrite, Toluene, Xylene
	Emulsion Breakers	Acetic acid, Acetone, Ammonium chloride, Benzoic acid, Isopropyl Alcohol, Methanol, Naphthalene, Toluene, Xylene, Zinc chloride
Miscellaneous (cont.)	Fertilizers	Unknown
	Herbicides	Unknown
	Lead-free thread compound	Copper, Zinc
	Lubricants	1,2,4-Trimethylbenzene, Barium, Cadmium, Copper, n-Hexane, Lead, Manganese, Nickel, PAHs, POM, Zinc
	Methanol	Methanol
	Motor oil	Zinc compounds
	Paints	Aluminum, Barium, n-Butyl alcohol, Cobalt, Lead, Manganese, PAHs, POM, Sulfuric acid, Toluene, Triethylamine, Xylene
	Paraffin Control	Carbon disulfide, Ethylbenzene, Methanol, Toluene, Xylene
	Photoreceptors	Selenium
	Scale inhibitors	Acetic acid, Ethylene diamine tetra, Ethylene glycol, Formaldehyde, Hydrochloric acid, Isopropyl alcohol, Methanol, Nitrilotriacetic acid
	Sealants	1,1,1-Trichloroethane, n-Hexane, PAHs, POM

Table 3.6-1. List of Hazardous Constituents Potentially Used or Produced During Construction, Drilling, Production, and Reclamation Operations Associated with Coalbed Methane and Natural Gas (continued)

Page 4 of 4

	Solvents	1,1,1-Trichloroethane, Acetone, t-Butyl alcohol, Carbontetrachloride, Isopropyl alcohol, MEK, Methanol, PAHs, POM, Toluene, Xylene
	Starting Fluid	Ethyl ether
	Surfactants	Ethylene diamine, Isopropyl alcohol, Petroleum naptha

Source: Modified from: BLM 2001 and BLM 1999

Table 3.8-1. Vegetation Manipulations Since 1988.

Year*	Name	Acres
Burns		
1990	40 Rod	400
	Boulder Lake	1000
	Burdick Creek	1000
1999	Brodie Draw	2000
	Coal Creek	1000
1998	Cottonwood	1000
	Cretaceous	400
	Spade	500
	Deer Hills	400
1998	Gentle Annie	1000
Herbicide		
	Beecher	160
	Bench Corral	700
	Boulder Lake	1000
	McNinch Deer Hills	600
	O'Neil	200
Mechanical Treatments		
1999	Tip Top Mowing Brush Beating	2400
	Chaining	1700
	Pitting and Ripping	300

* The missing years will be provided by the BLM and included in the next version of this report.

Table 3.11-1. Estimated Annual Recreational Visitor Days.

Estimated Annual Recreational Visitor Days – Pinedale Field Office
Oct. 1, 1998 – Sep. 30, 2001

Recreational Activity	Recreational Visitor Days
Archery	760
Backpacking	4,118
Bicycling – Mountain	5,066
Bicycling – Road	16
Camping	35,168
Climbing – Mountain/Rock	458
Driving for Pleasure	4,182
Environmental Education	55
Fishing	73,227
Hiking/Walking/Running	30,581
Horseback Riding	732
Nature Study	880
OHV – ATV	1,268
OHV – Cars/Trucks/SUVs	155
Pack Trips	2,746
Photography	880
Picnicking	1,366
Power Boating	789
Row/Float/Raft	138,630
Skiing – Cross Country	2,123
Snowmobiling	12,368
Staging/Comfort Stop	829
Swimming/Water Play	854
Viewing Wildlife	2,727
Total Recreational Visitor Days	**319,978**

P-Figure 3.11-1 Estimated Annual Recreational Visitor

Table 3.12-1. Geographic Characteristics of Study Area

Geographic Characteristics of Study Area

Geographic Characteristic	Lincoln	Sublette	Fremont	Sweetwater	Wyoming	U.S.
Land Area (Millions of Acres)	2.6	3.1	5.9	6.7	62.1	2,200
Land Area (Sq. Miles)	4,069	4,883	9,182	10,425	97,100	3,537,441
Persons Per Square Mile	3.6	1.2	3.9	3.6	5.1	79.6

Source Data: Census Bureau State and County Quickfacts

Table 3.12-2. Population Centers.

Population Centers

County	**City**	**Population**		
		1990	**2000**	**% Change**
Lincoln	Afton	1,394	1,818	30.4
	Kemmerer	3,020	2,651	-12.2
Sublette	Pinedale	1,181	1,412	19.6
Fremont	Lander	7,023	6,867	-2.2
	Riverton	9,202	9,310	1.2
Sweetwater	Green River	12,711	11,808	-7.1
	Rock Springs	19,050	18,708	-1.8

P-Figure 3.12-2 Population Centers

Table 3.12-3. Change in Civilian Labor Force 1991-2000.

TABLE 3.12 – 3
CHANGE IN CIVILIAN LABOR FORCE 1991-2000

Location	Change in Civilian Labor Force Between 1991-2000	Percentage Change in Civilian Labor Force Between 1991-2000
Lincoln County, WY	582	9.7%
Sublette County, WY	542	20.1%
Fremont County, WY	2,546	16.3%
Sweetwater County, WY	-550	-2.7%
Economic Study Area	3,120	7.0%
Wyoming	31,810	14.0%

Source: U.S. Department of Labor, Bureau of Labor Statistics, Local Area Unemployment Statistics

P-Figure 3.12-3 Change in Labor Force

Table 3.12-4. Measure of Economic Diversity Using Sources of Personal Income $2001

Measure of Economic Diversity Using Sources of Personal Income ($2001)
Lincoln, Sublette, Fremont and Sweetwater Counties, Wyoming

	Income Source	**Personal Income by Source ($1,000)**			**Percentage of Total Personal Income**		
		1979	**1989**	**1999**	**1979**	**1989**	**1999**
Labor Income	Agriculture	$32,113	$15,652	$26,057	2%	1%	1%
	Construction	$240,737	$92,100	$149,774	12%	5%	6%
	Mining	$640,421	$404,677	$358,054	33%	23%	15%
	Manufacturing	$59,122	$53,593	$125,186	3%	3%	5%
	Federal and State Government	$72,579	$89,528	$102,014	4%	5%	4%
Non-Labor Income	Transfer payments	$129,498	$200,919	$313,028	7%	11%	13%
	Investment Income	$77,489	$106,696	$163,112	4%	6%	7%
	Total Personal Income	$1,955,088	$1,766,545	$2,324,877	64.0%	54.5%	53.2%

P-Figure 3.12-4 Measure of Economic Diversity

Table 3.12-5. Oil and Gas Tax Revenues as Percentage of Total County Property Taxes – FY 2001

Oil and Gas Tax Revenues as Percentage of Total County Property Taxes - Fiscal Year 2001

County	Total Ad Valorem Tax Revenue - Oil and Gas	Total County Property Tax Revenues	Oil and Gas Tax Revenue as Percentage of Total County Property Tax Revenues
Lincoln	$20,458,863	$35,104,400	58%
Sublette	$45,827,184	$51,050,435	90%
Fremont	$25,982,819	$37,234,045	70%
Sweetwater	$45,206,413	$89,145,656	51%
Total Study Area	$135,890,017	$212,534,536	64%

P-Figure 3.12-5 Oil and Gas Tax

Table 3.12-6. Total Severance Tax Distributions for Government Entities in the Study Area – FY 2001

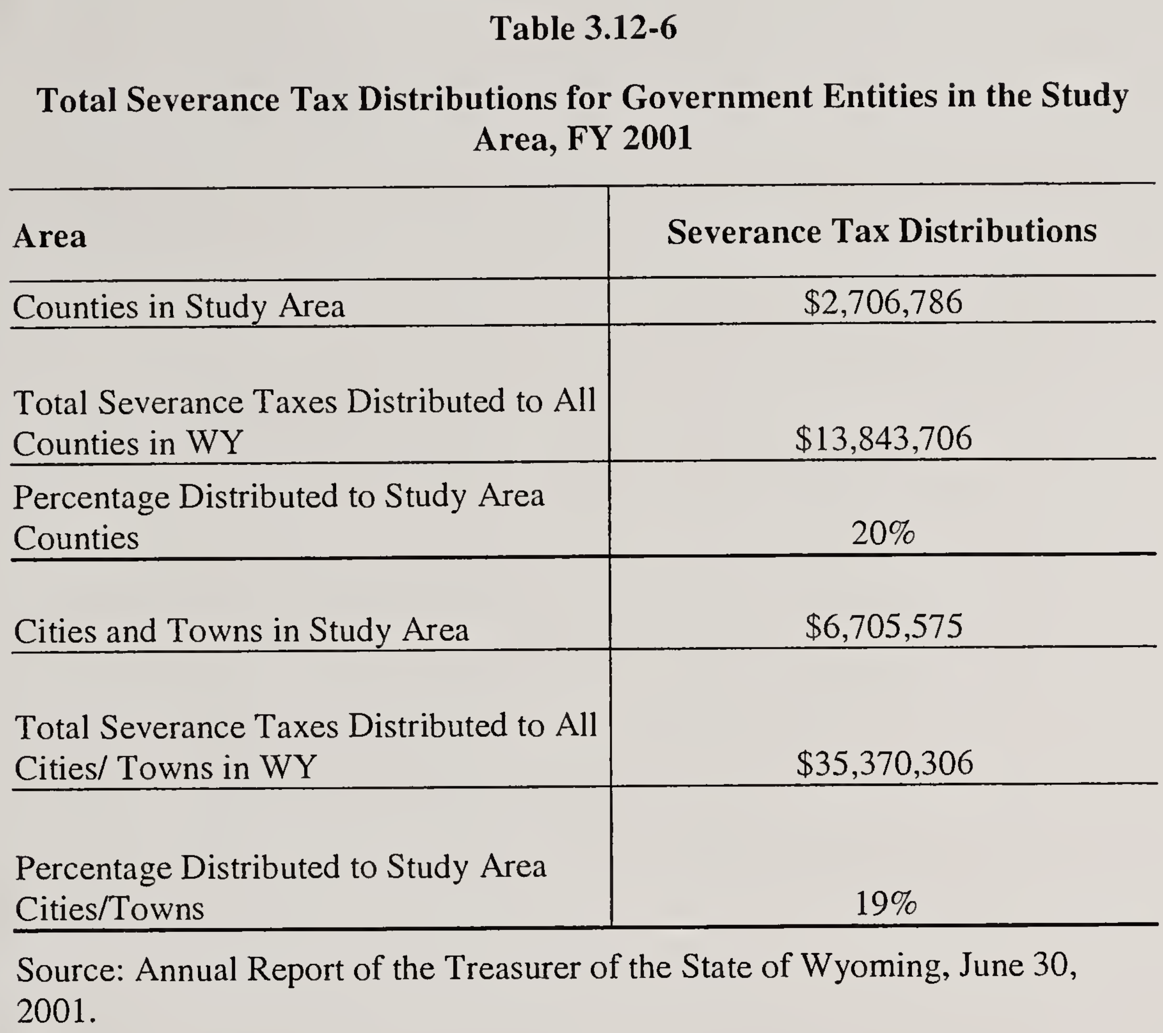


Table 3.12-6

Total Severance Tax Distributions for Government Entities in the Study Area, FY 2001

Area	**Severance Tax Distributions**
Counties in Study Area	$2,706,786
Total Severance Taxes Distributed to All Counties in WY	$13,843,706
Percentage Distributed to Study Area Counties	20%
Cities and Towns in Study Area	$6,705,575
Total Severance Taxes Distributed to All Cities/ Towns in WY	$35,370,306
Percentage Distributed to Study Area Cities/Towns	19%

Source: Annual Report of the Treasurer of the State of Wyoming, June 30, 2001.

P-Figure 3.12-6 Total Severance Tax

Table 3.12-7. Severance Taxes Generated by Product

Table 3.12-7
Severance Taxes Generated by Product

County	Natural Gas	Crude Oil	Stripper Oil	Coal	Trona	Sand and Gravel	Total
Lincoln	$17,872,872	$1,081,045	$76,383	$4,191,559	$0	$4,144	$23,226,003
Sublette	$37,672,996	$4,585,894	$263,542	$0	$0	$6,739	$42,529,172
Fremont	$16,329,921	$3,338,380	$488,363	$0	$0	$5,969	$20,162,633
Sweetwater	$32,491,495	$6,233,244	$32,737	$7,220,190	$8,248,759	$8,978	$54,235,402
Total - Study Area	$104,367,285	$15,238,563	$861,025	$11,411,749	$8,248,759	$25,830	$140,153,210
Percentage of Severance Taxes Generated from Each Product	74.5%	10.9%	0.6%	8.1%	5.9%	0.02%	100.0%

Table 3.12-8. PILT Payments to Counties 1991-2001.

PILT Payments to Counties 1991-2001

Year	Lincoln	Sublette	Fremont	Sweetwater	Total
1991	$293,828	$242,150	$759,347	$871,591	$2,166,916
1992	$299,071	$242,150	$718,561	$874,610	$2,134,392
1993	$309,046	$242,150	$727,590	$870,496	$2,149,282
1994	$262,435	$243,216	$607,738	$788,650	$1,902,039
1995	$288,298	$225,819	$629,859	$789,808	$1,933,784
1996	$348,238	$264,198	$769,713	$920,730	$2,302,879
1997	$344,289	$233,474	$774,223	$863,835	$2,215,821
1998	$362,946	$244,059	$768,381	$858,921	$2,234,307
1999	$394,822	$240,299	$812,287	$902,308	$2,349,716
2000	$418,646	$256,483	$866,146	$949,649	$2,490,924
2001	$616,591	$371,922	$1,236,994	$1,321,047	$3,546,554

Source: Wyoming BLM Annual Reports, 1991-2001.

P-Figure 3.12-8 PILT Payments

Table 3.12-9. Population Distribution (Percentage) by Race and Hispanic by County

Population Distribution (Percentage) by Race and Hispanic by County: 2000

County	White	Black or African American	American Indian and Alaska Native	Asian	Native Hawaiian and Other Pacific Islander	Some Other Race	Two or More Races	Hispanic or Latino (of any race)
Lincoln	97.1	0.1	0.6	0.2	0.1	0.7	1.2	2.2
Sublette	97.5	0.2	0.5	0.2	0.1	0.5	1	1.9
Fremont	76.5	0.1	19.7	0.3	0.0	1.2	2.2	4.4
Sweetwater	91.6	0.7	1	0.6	0.0	3.6	2.4	9.4
Wyoming	92.1	0.8	2.3	0.6	0.1	2.5	1.8	6.4

Source: U.S. Bureau of Census

Percentages may not add to 100 because of individuals may report ethnicity under more than one category.

Table 3.12-10. Poverty Rates 1998 and 1989.

Poverty Rates 1998 and 1989

Location	**1989**	**1998**
Lincoln, Co.	9.8%	9.3%
Sublette, Co.	8.4%	8.4%
Fremont, Co.	19.1%	17.0%
Sweetwater, Co.	8.0%	8.1%
Wyoming	11.9%	11.4%
West	12.5%	14.6%
U.S.	12.8%	13.3%

Source: U.S. Census Bureau, State Model Estimates of the Percentage of Persons of All Ages in Poverty

Table 3.15-1. Acreage of Vegetation Communities within the Pinedale Field Office Area

Table 3.15-1. Acreage of Vegetation Communities within the Pinedale Field Office Area.

Vegetation Community	Vegetation Type	Acreage
Big sagebrush	Wyoming big sagebrush	823,495
	Mountain big sagebrush	267,037
Other shrub	Desert shrub	61,050
	Greasewood	6,977
Aspen woodlands	Aspen woodlands	55,370
Lodgepole pine	Lodgepole pine	41,600
Other conifer	Limber pine	9,440
	Douglas fir	387
	Spruce fir	222
Riparian/wetland	Shrub-dominated riparian	33,970
	Forest-dominated riparian	19,547
	Herbaceous-dominated riparian	937
Open water	Open water	3,562
Grasslands	Grasslands	6957
	Subalpine meadow	304
Human impact	Irrigated crops	278,849
	Dryland crops	5283
	Urban	732
Barren	Barren	5,664
	Total Acreage	**1,621,383**

P-Figure 3.15-1 Acreage of Vegetation

Table 3.15-2. Noxious Weeds as Designated by the Wyoming Weed and Pest Control Act.

Table 3.15-2. Noxious Weeds as Designated by the Wyoming Weed and Pest Control Act.

Scientific Name	Common Name	Present in Planning Area
Convolvulus arvensis	Field bindweed	X
Cirsium arvense	Canada thistle	X
Euphorbia esula	Leafy spurge	X
Sonchus arvensis	Perennial sowthistle	X
Agropyron repens	Quackgrass	
Cardaria draba and *Cardaria pubescens*	Hoary cress	X
Lepiduim latifolium	Perennial pepperweed	X
Chrysanthemum leucanthemum	Ox-eye daisy	X
Franseria discolor	Skeletonleaf bursage	
Centaurea repens	Russian knapweed	
Centaurea maculosa	Spotted knapweed	
Centaurea diffusa	Diffuse knapweed	
Linaria vulgaris	Yellow toadflax	X
Linaria dalmatica	Dalmation toadflax	
Isatis tinctoria	Dyer's woad	
Carduus nutans	Musk thistle	
Hyoscyamus niger	Black henbane	X
Onopordum acanthium	Scotch thistle	
Arctium minus	Common burdock	
Carduus acanthoides	Plumeless thistle	
Cynoglossum officinale	Houndstongue	X
Lythrum salicaria	Purple loosestrife	
Tamarix spp.	Saltcedar	

Table 3.16-1. Visual Resource Management Classifications and Acreage.

Table 3.16-1. Visual Resource Management Classifications and Acreage.	
Classification	**Acres**
I	12,036
II	215,826
III	594,809
IV	795,329
TOTAL	**1,618,000**

(BLM 1988)

P-Figure 3.16-1. Visual Resource

Table 3.17-1. Water Use in the Planning Area..

Table 3.17-1. Water Use in the Planning Area.

Water Use	Annual Surface Water Use (acre-feet)	Annual Groundwater Use (acre-feet)	Total Annual Water Use (acre-feet)	Percentage
Municipal	924	610	1,534	0.7%
Domestic (rural)	Unknown	Unknown	1,936[A]	0.9%
Irrigation	213,292	Minimal	213,292	98%
Industrial	Minimal	788	788[A]	0.4%
Total			**217,550**	

Source: States West Water Resources Company 2001

[A] Water use was assumed to be half of that given for the basin as a whole.

P-Figure 3.17-1 Water Use

Table 3.19-1. Big Game Population Status.

Table 3.19-1. Big Game Population Status.						
Species	**Herd Unit**	**Hunt Areas**	**Population Estimate**[1] 2001 POST SEASON	**Population Trend**	**Average Buck:Doe**	**Population Objective**[2]
Pronghorn	Sublette	86-90	47,700	Stable	0.52:1	48,000
Mule deer	Sublette	138-142, 154, 162	34,700	Up	0.35:1	32,000
	Wyoming Range	143, 162	43,400	Up		50,000
Elk	Upper Green River	93, 95, 96	2,650	Stable	0.28:1	2,500
	Pinedale	97, 98	2,000	Stable		1,900
	Piney	92, 94	2,500	Stable		2,424
	Hoback	87	1,100	Stable		1,100
Moose	Sublette	4, 5, 25, 26	5,700	Stable	0.69:1	5,500

[1] Data from Wyoming Game and Fish Department Annual Big Game Herd Unit Report, 2001

[2] Post-season population

Table 3.19-2. Big Game Habitat Status.

Table 3.19-2. Big Game Habitat Status.															
Big Game Species	Summer Range			Winter Range			Winter/Yearlong Range			Crucial Winter Range			Crucial Winter/Yearlong Range			Total Habitat
	Acres Public Land[1]	Quantity[2]	Quality[3]	Acres Public Land	Quantity	Quality	Acres Public Land	Quantity	Quality	Acres Public Land	Quantity	Quality	Acres Public Land	Quantity	Quality	
Pronghorn	723,319	D	F	2,412	S	G	13,474	D	G	9,365	D	F	46,699	S	G	795,269
Mule Deer	410,931	D	F	6,669	S	G	108,714	D	G	67,849	D	G	45,928	S	G	640,091
Elk	189,887	S	G	32,927	D	F-P	220,391	D	F-P	36,429	D	F	22,527	S	G	502,161
Moose	136,396	D	F	61,942	S	G	35,097	D	F	284	S	G	272,086	S	G	505,805

[1] Represents acres of public land within planning unit boundaries
[2] Represents habitat quantity as I-increasing; S-stable; D-decreasing
[3] Represents habitat quality as E-excellent; G-good; F-fair; P-poor

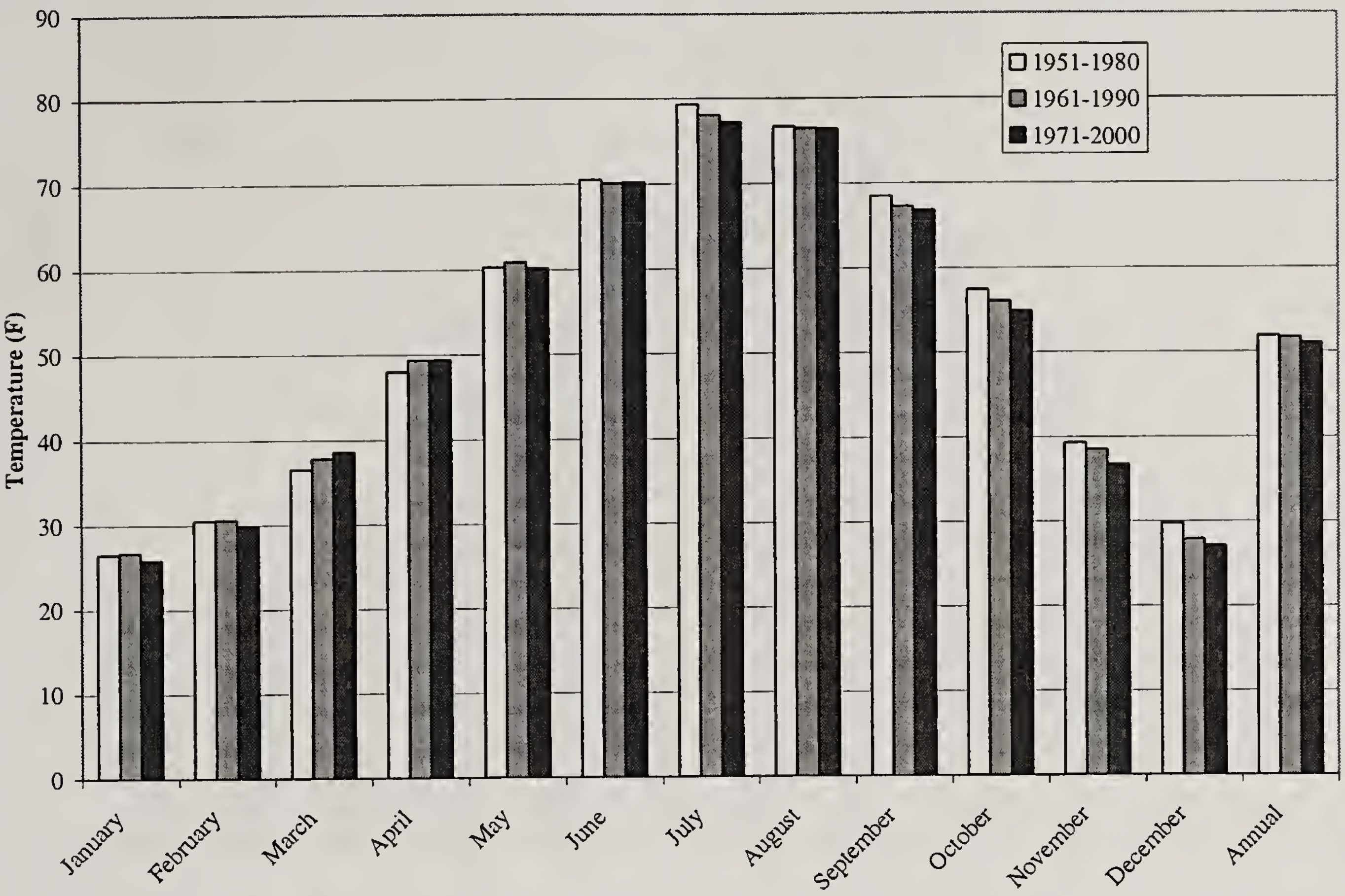
Table 3.19-3. Big Game Hunting Statistics for Hunt Areas Within the Pinedale RMPPA in 2000

Table 3.19-3. Big Game Hunting Statistics for Hunt Areas Within the Pinedale RMPPA in 2000[1].

Species	WDGF Hunt Areas	Estimated Harvest	Average Fawn:Doe	Average Buck:Doe	Total Hunters	Hunter Success	Total Recreation Days
Pronghorn	86-90	2,920	0.57:1	0.52:1	3340	87%	9610
Mule deer	138-143, 154, 162	1760	0.82:1	0.35:1	3820	46%	21570
Elk	87, 92-98	3405	0.36:1	0.28:1	8035	42%	53280
Moose	4, 5, 25, 26	215	0.46:1	0.69:1	240	89%	1285
Bighorn sheep	8	8	0.16:1	0.41:1	10	80%	75

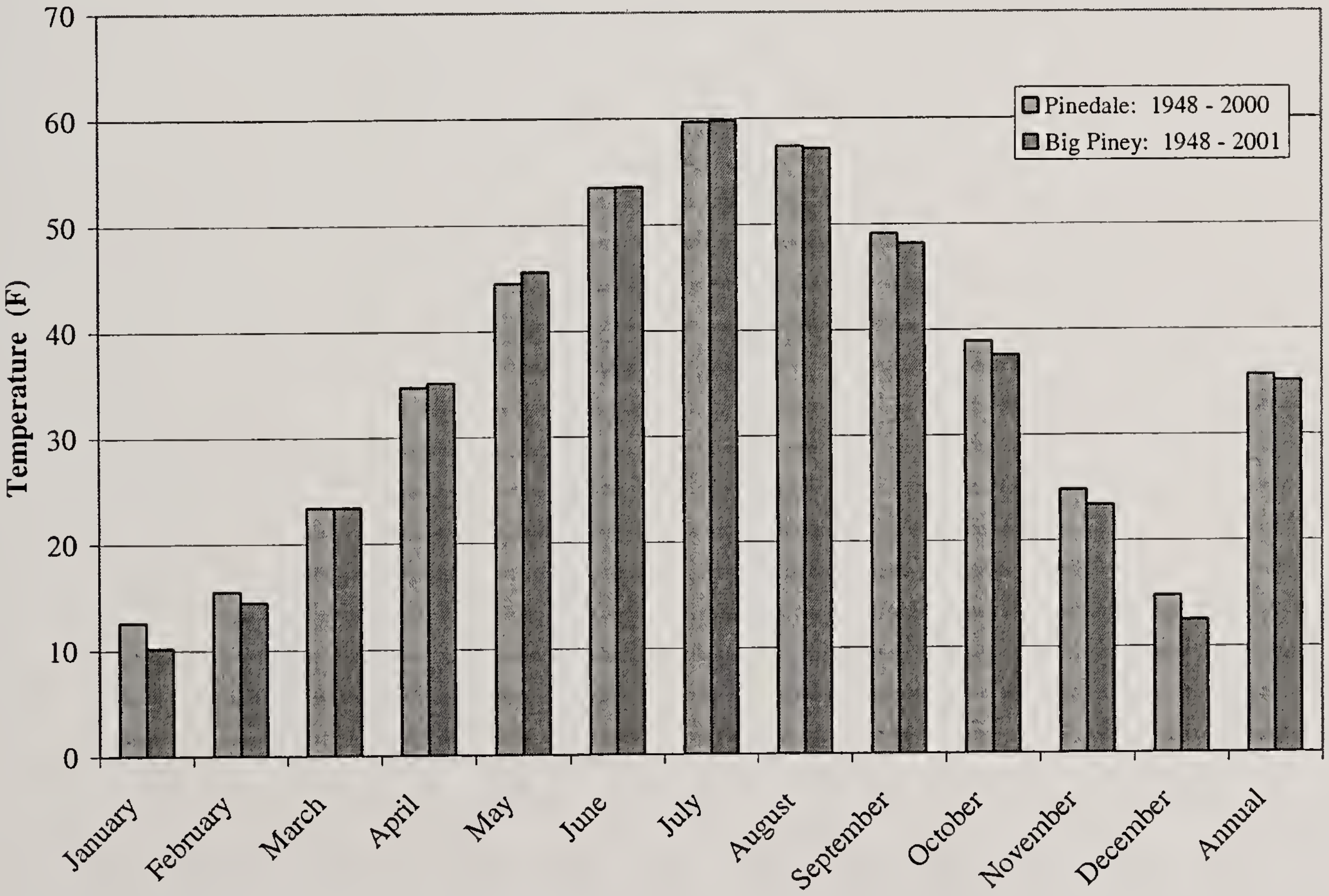
[1] Data from Wyoming Game and Fish Department Annual Harvest Report 2000.

Figure 3.1-1a. Mean Monthly Temperatures in the Pinedale Region.



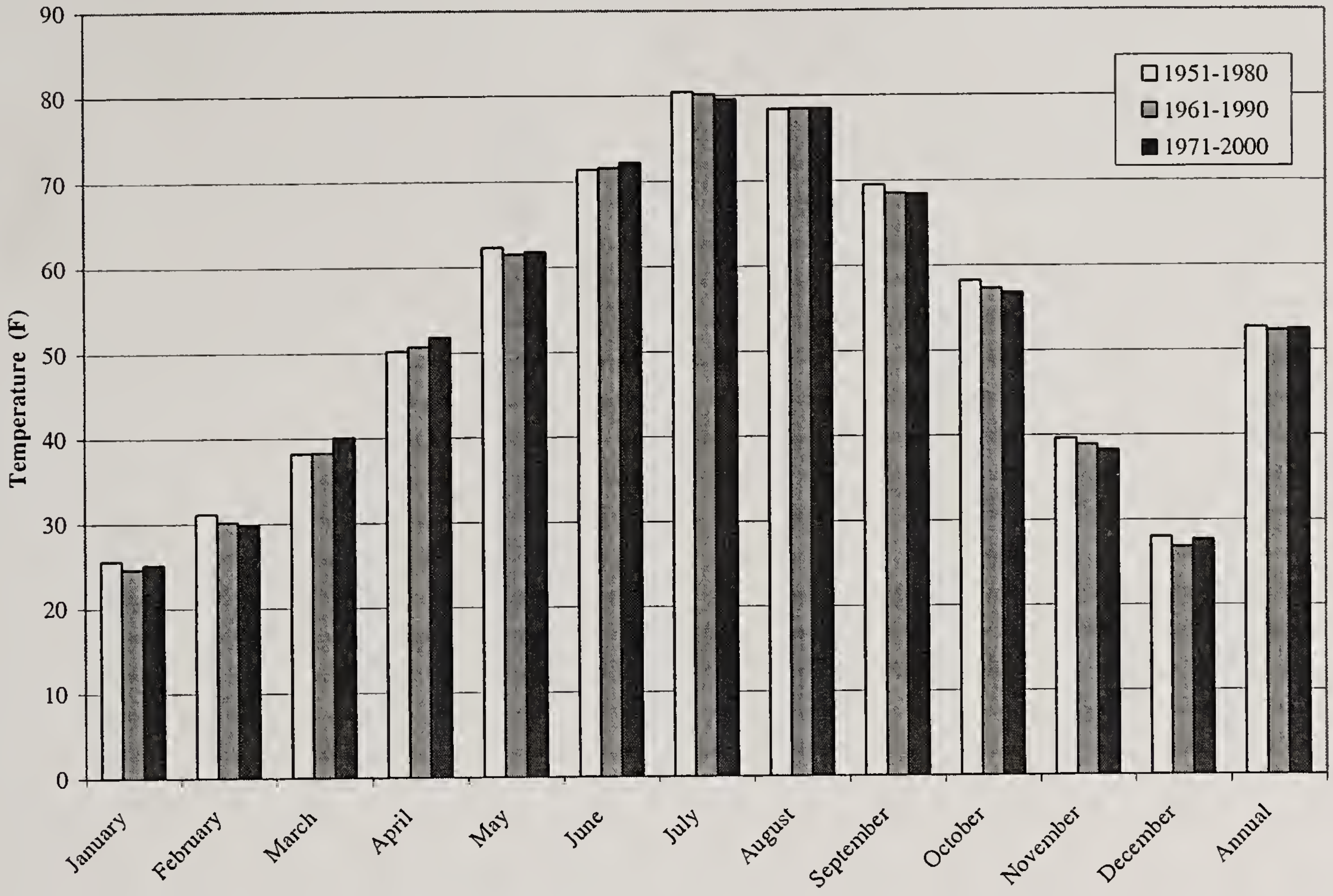
Source: Western Regional Climate Center.

Figure 3.1-1b. Mean Monthly Maximum Temperature Trend in Pinedale, Wyoming.



Source: Western Regional Climate Center.

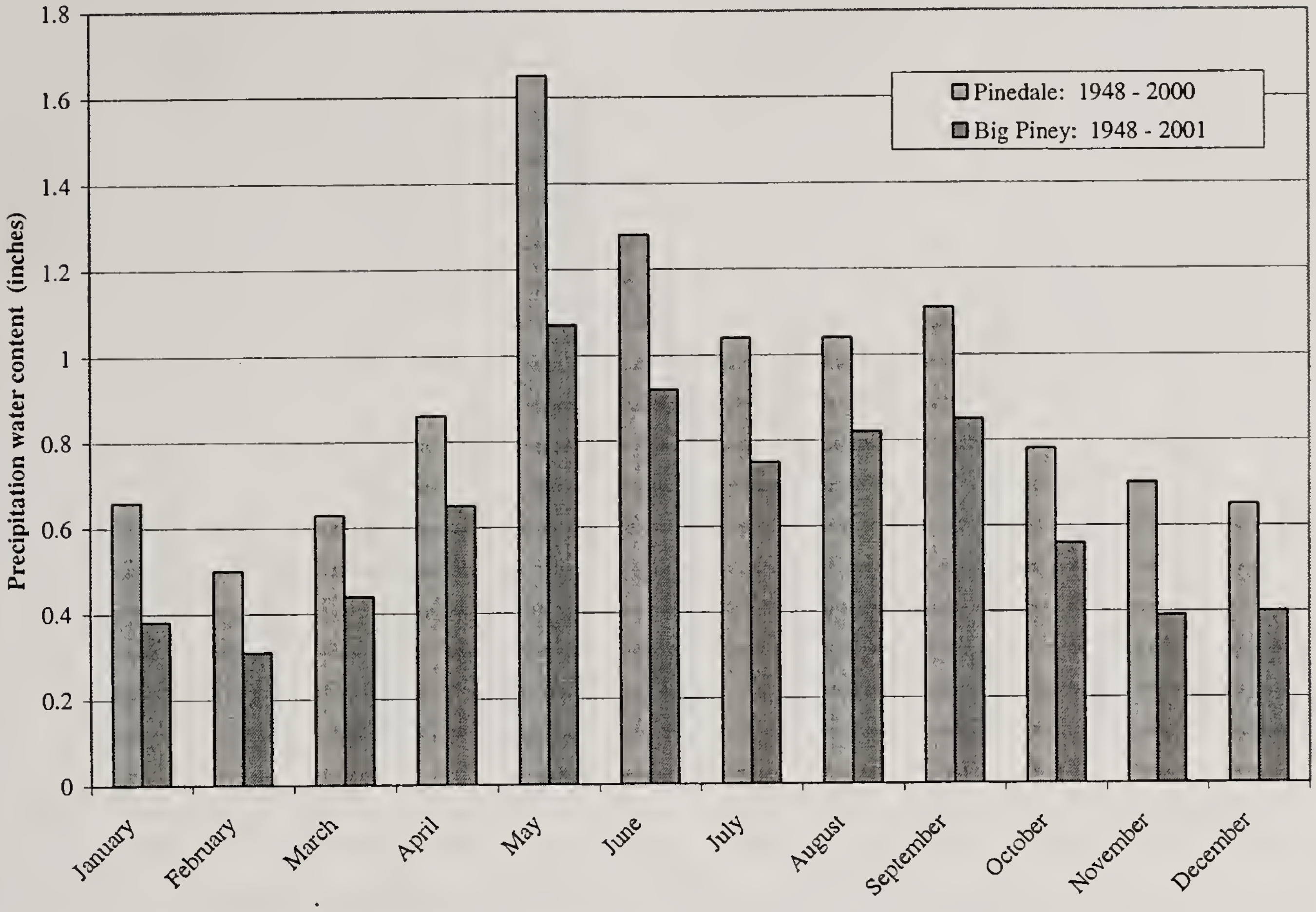
Figure 3.1-1c. Mean Monthly Maximum Temperature Trend in Big Piney, Wyoming.



Source: Western Regional Climate Center.

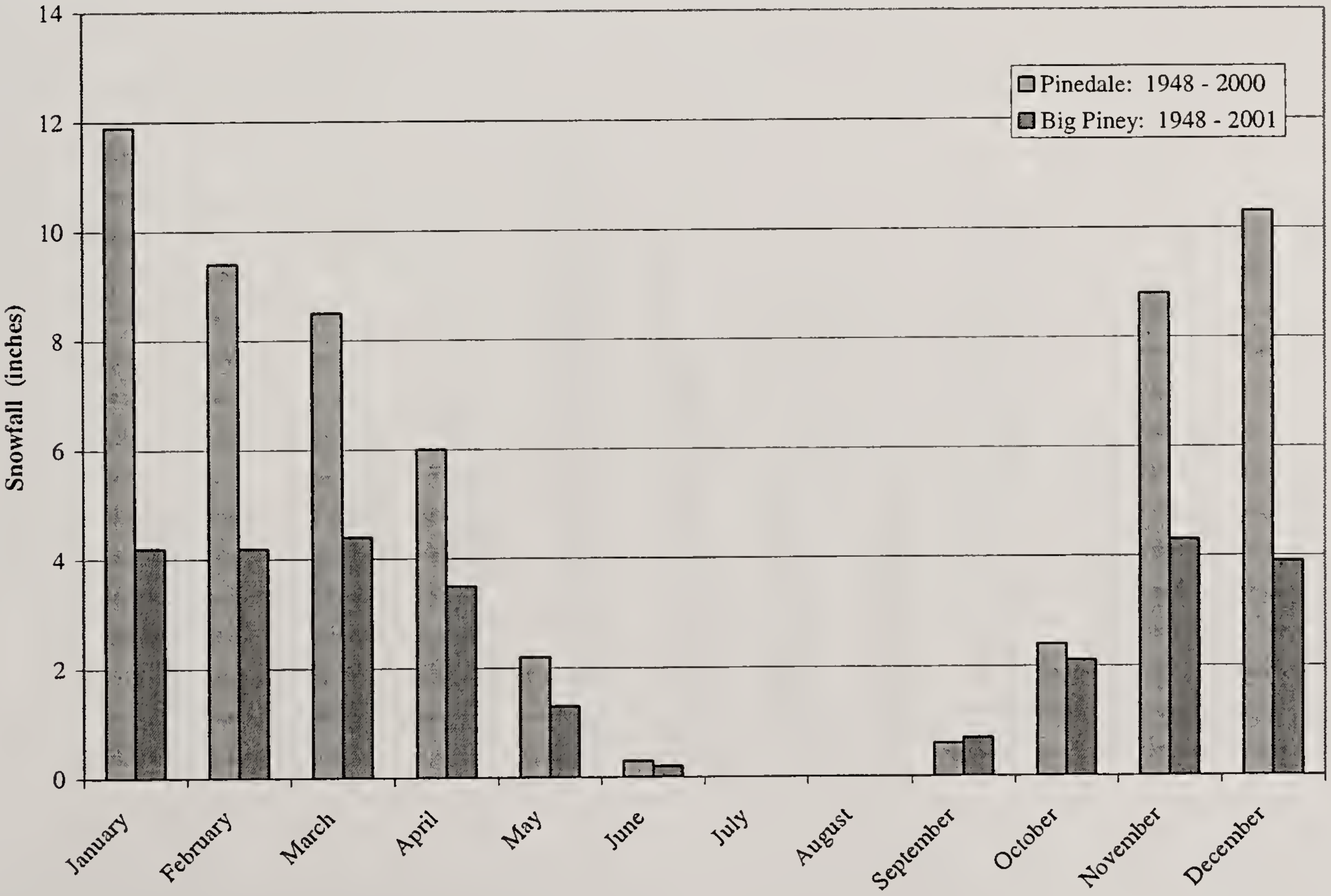
Figure 3.1-2a. Mean Monthly Precipitation in the Pinedale Region.

1 of 3



Source: Western Regional Climate Center.

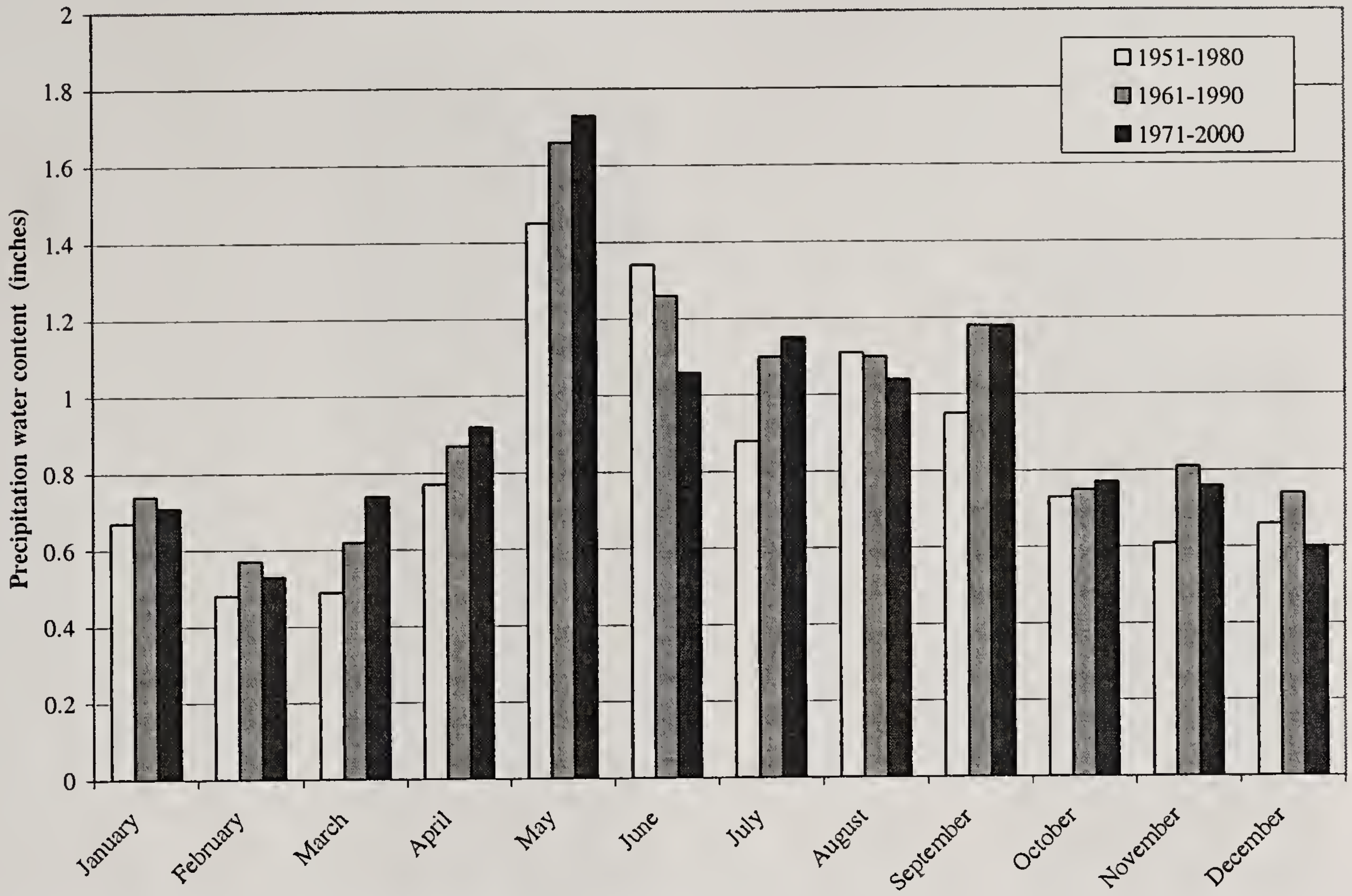
Figure 3.1-2b. Mean Monthly Snowfall in the Pinedale Region.



Source: Western Regional Climate Center.

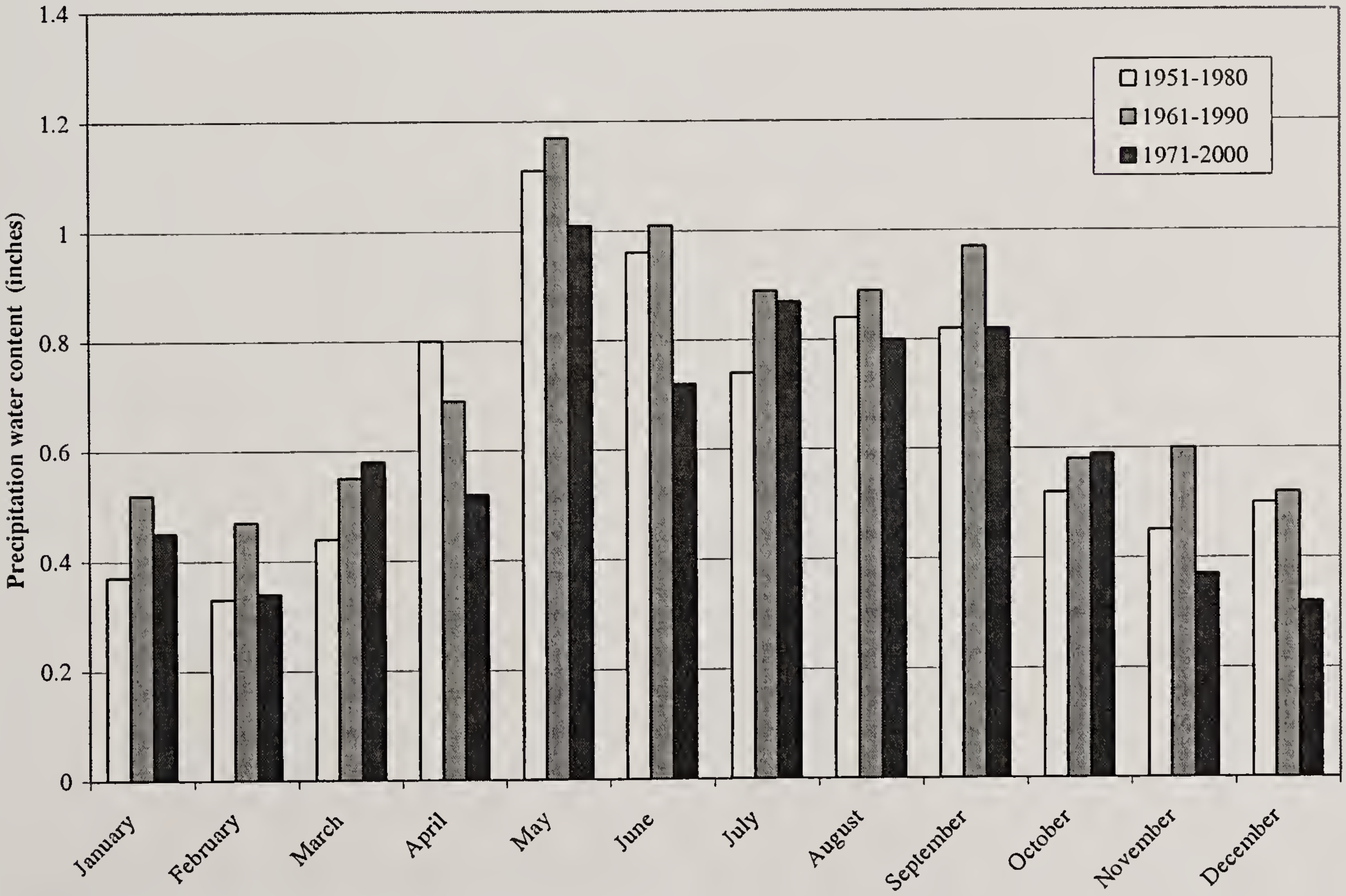
P-Figure 3.1-2a Precipitation

Figure 3.1-2c. Mean Monthly Precipitation in Pinedale, Wyoming.



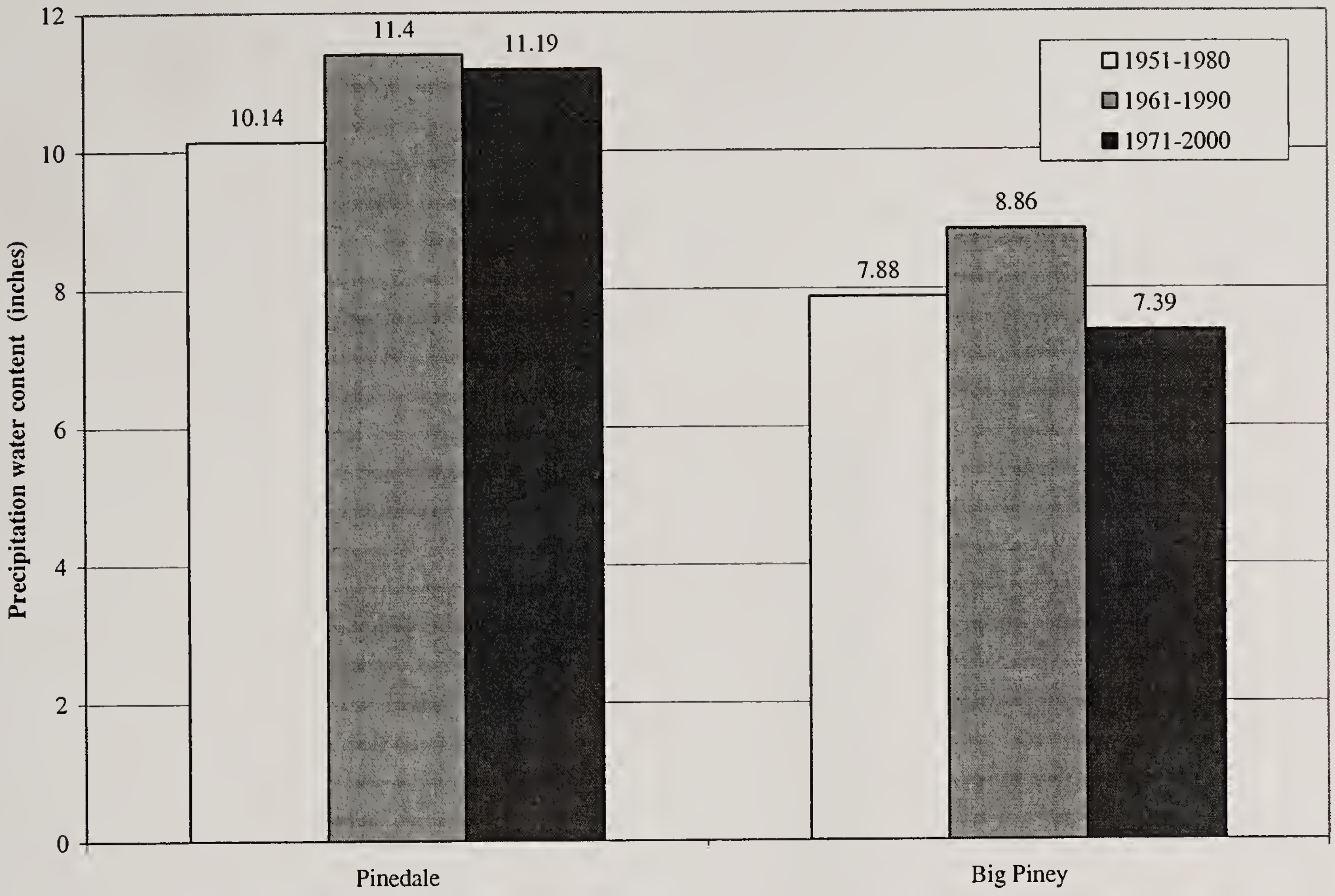
Source: Western Regional Climate Center.

Figure 3.1-2d. Mean Monthly Precipitation Trend in Big Piney, Wyoming.



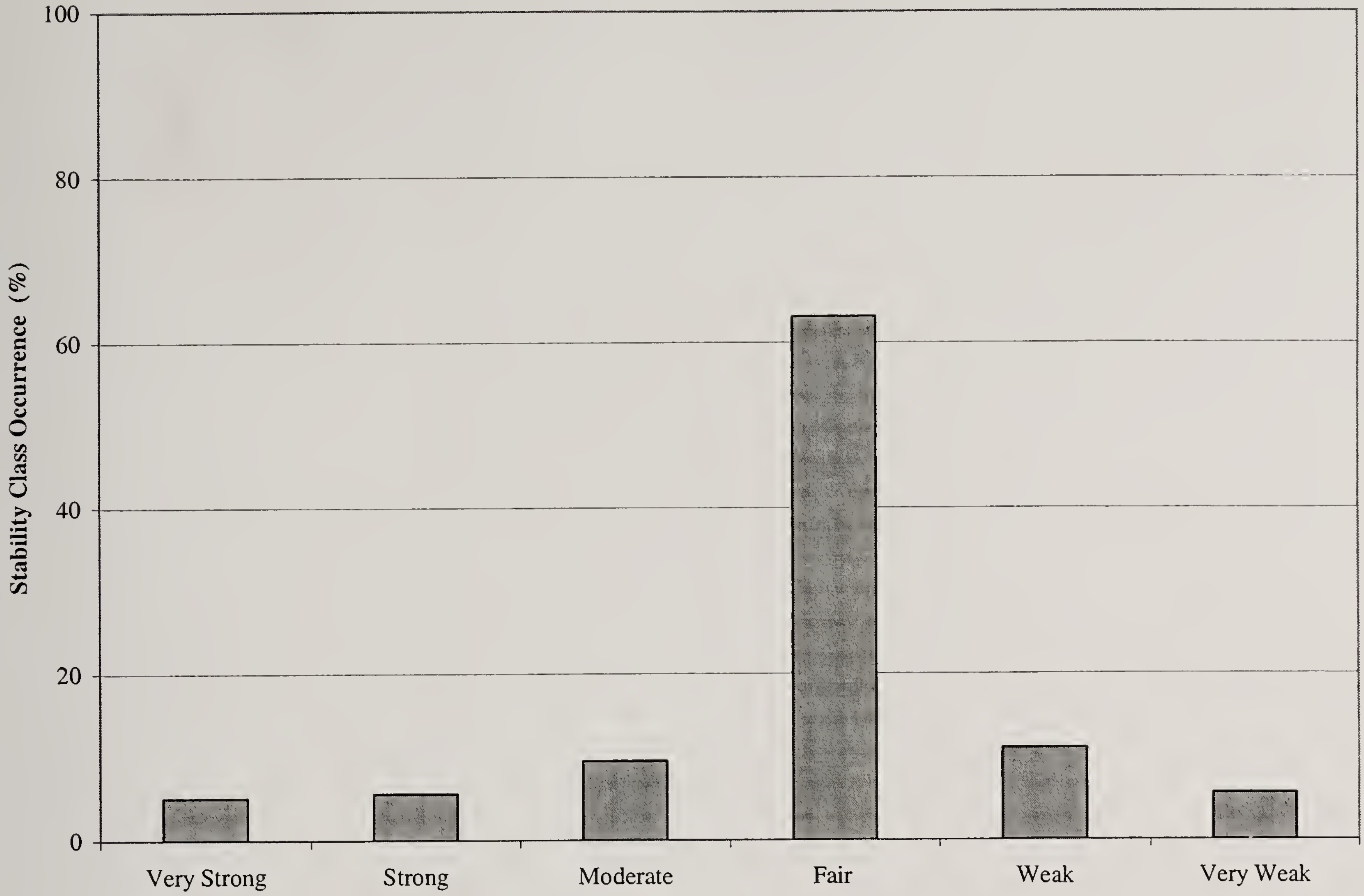
Source: Western Regional Climate Center.

Figure 3.1-2e. Mean Annual Precipitation Trend in the Pinedale Region.



Source: Western Regional Climate Center.

Figure 3.1-3. Capacity to Disperse Air Pollutants in Rock Springs, Wyoming.



Source: Continental Divide EIS.

P-Figure 3.1-3 Air Capacity

Figure 3.1-4. Wind Rose for Pinedale, Wyoming.

Need to obtain figure from Susan Caplan, BLM Wyoming.

Source:

P-Figure 3.1-4 Air Wind

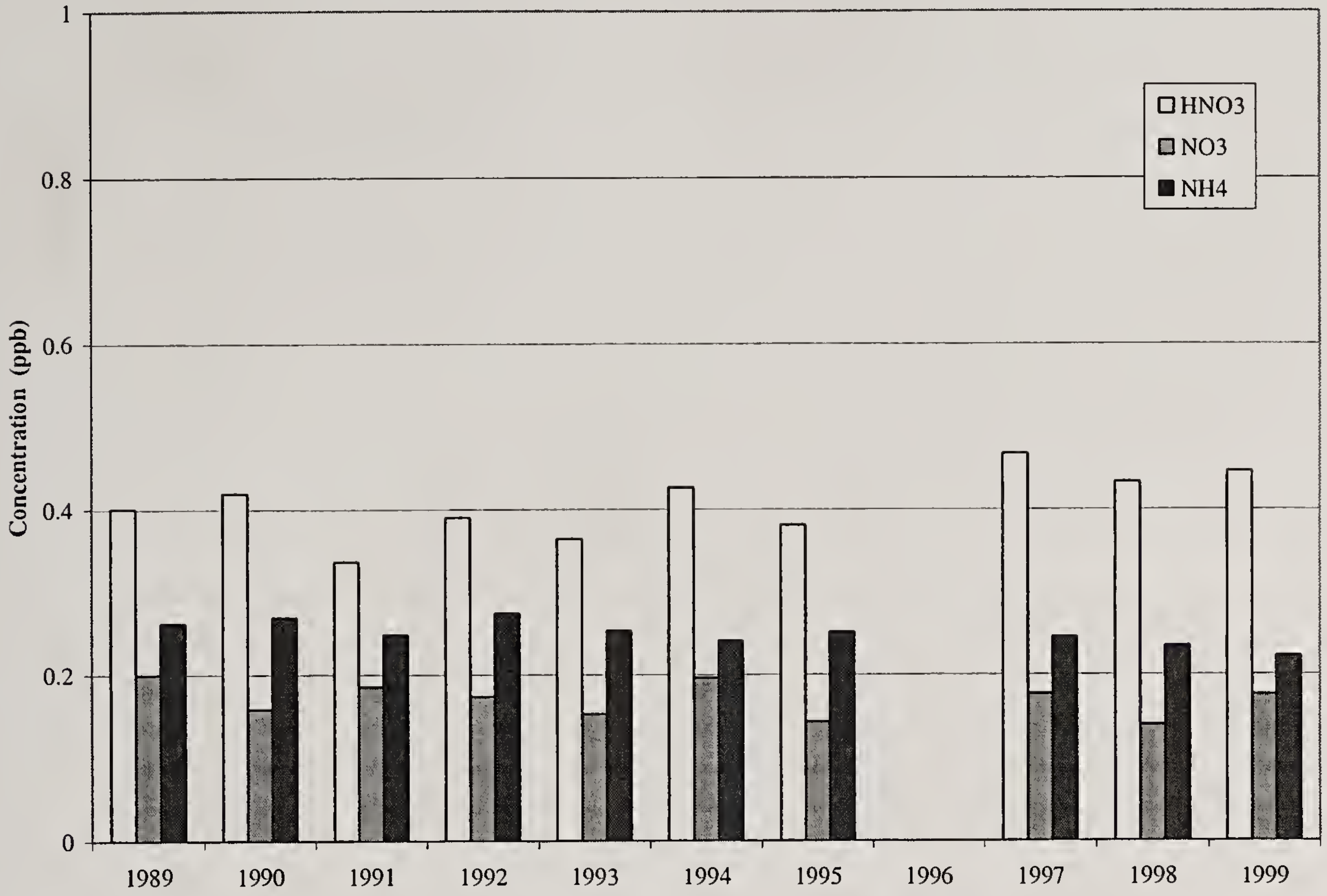
Figure 3.1-5. Air Quality PSD Class I Areas.

Need to obtain figure from Susan Caplan, BLM Wyoming.

Source:

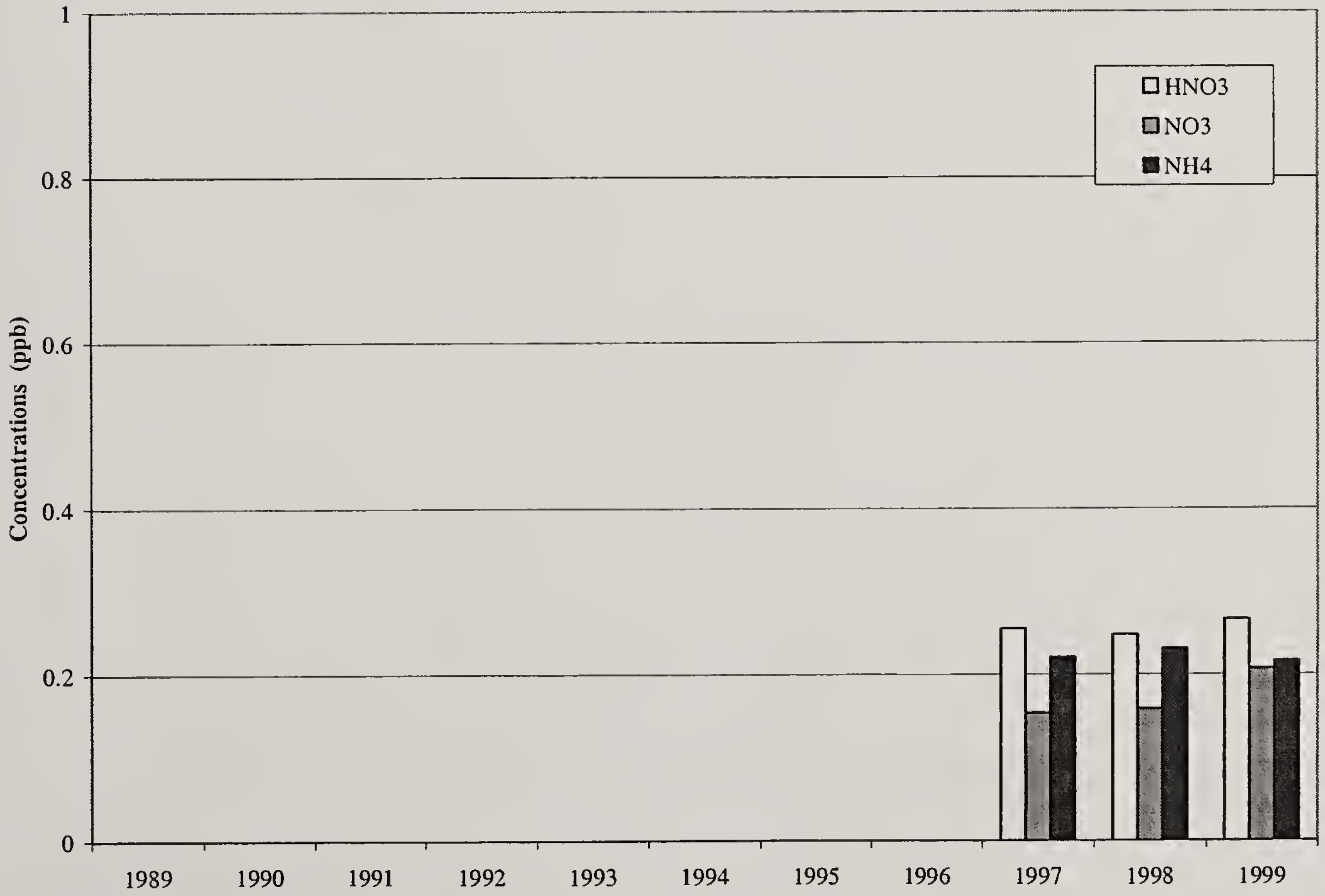
P-Figure 3.1-5 PSD Class I

Figure 3.1-6a. Mean Annual Concentrations of Nitrogen Compounds in Pinedale, Wyoming.



Source: CASTNet.

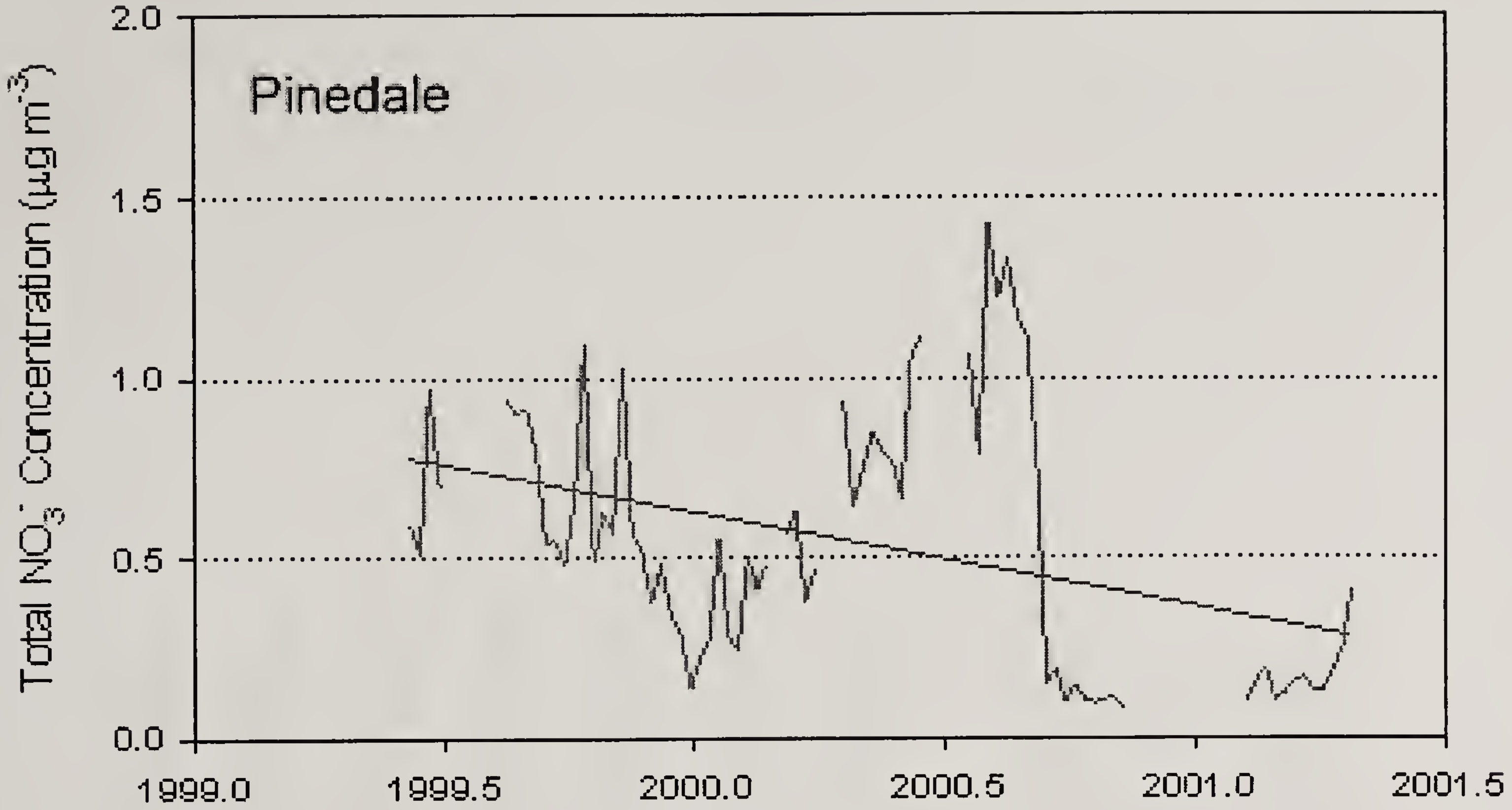
Figure 3.1-6b. Mean Annual Concentrations of Nitrogen Compounds in Yellowstone National Park.



Source: CASTNet.

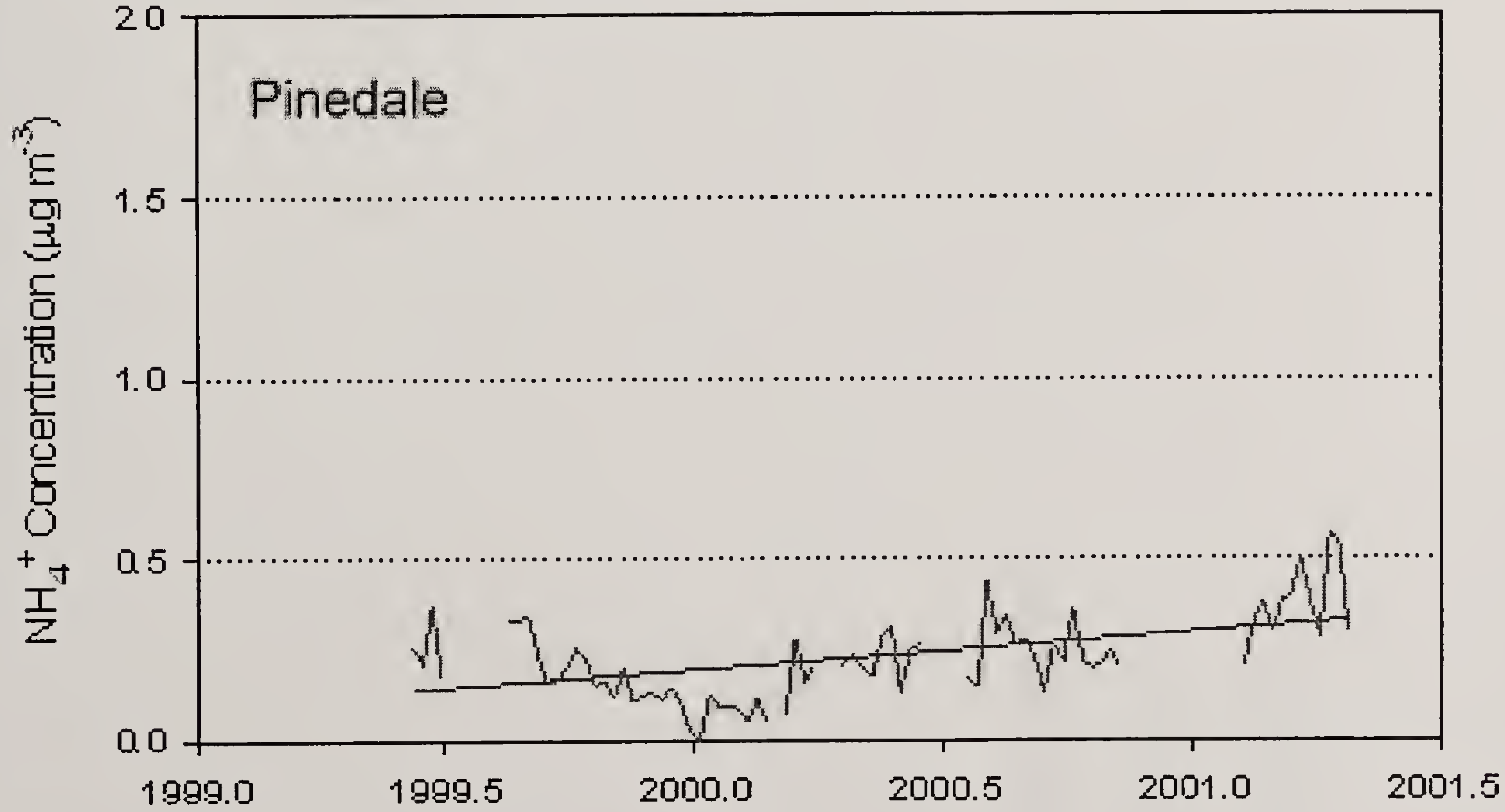
P-Figure 3.1-6a Nitrogen

Figure 3.1-7a. Weekly Concentrations of NO_3.



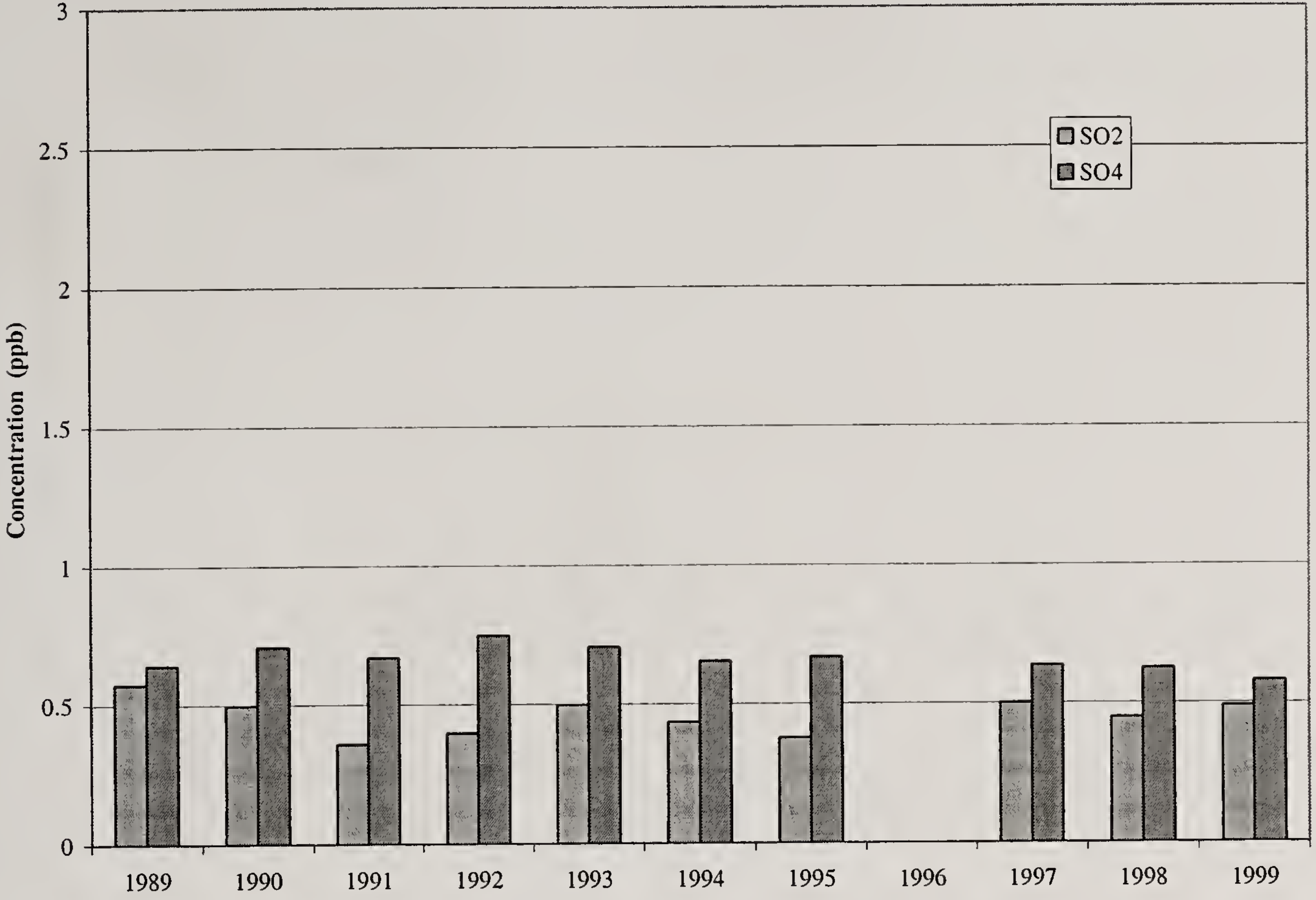
Source: WARMS.

Figure 3.1-7b. Weekly Concentrations of NH_4.



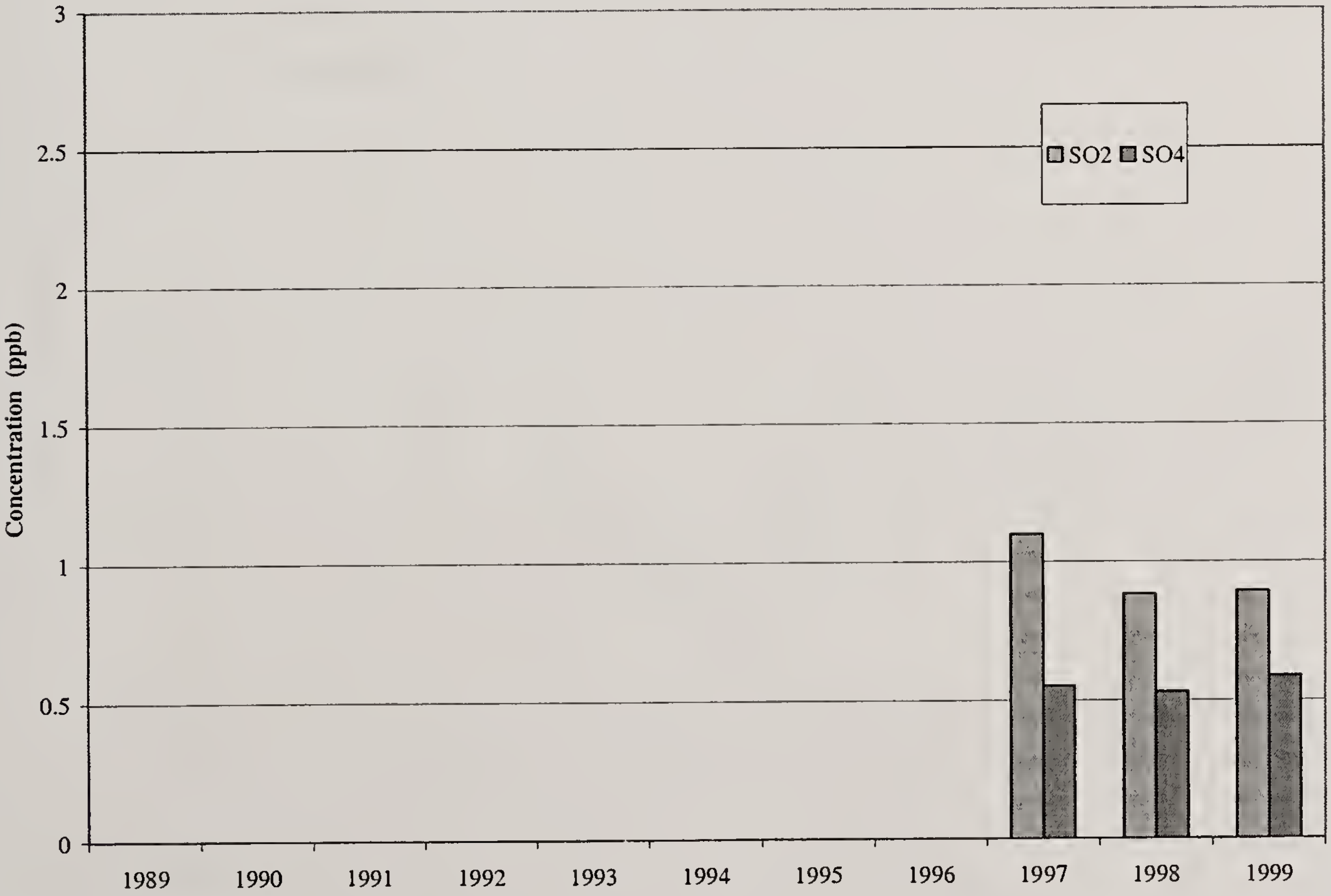
Source: WARMS.

Figure 3.1-8a. Mean Annual Concentrations of Sulfur Compounds in Pinedale, Wyoming.



Source: CASTNet.

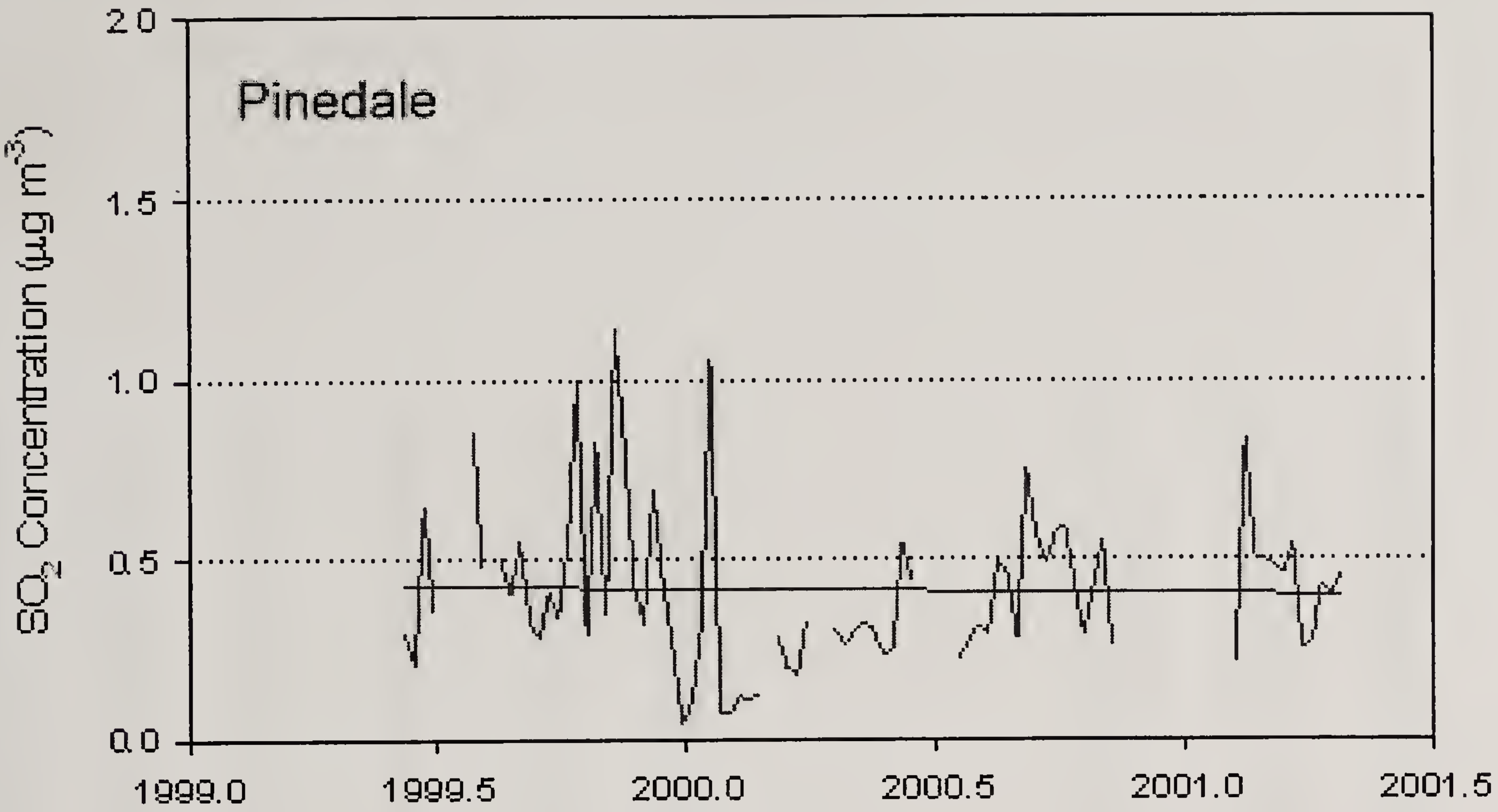
Figure 3.1-8b. Mean Annual Concentrations of Sulfur Compounds in Yellowstone National Park.



Source: CASTNet.

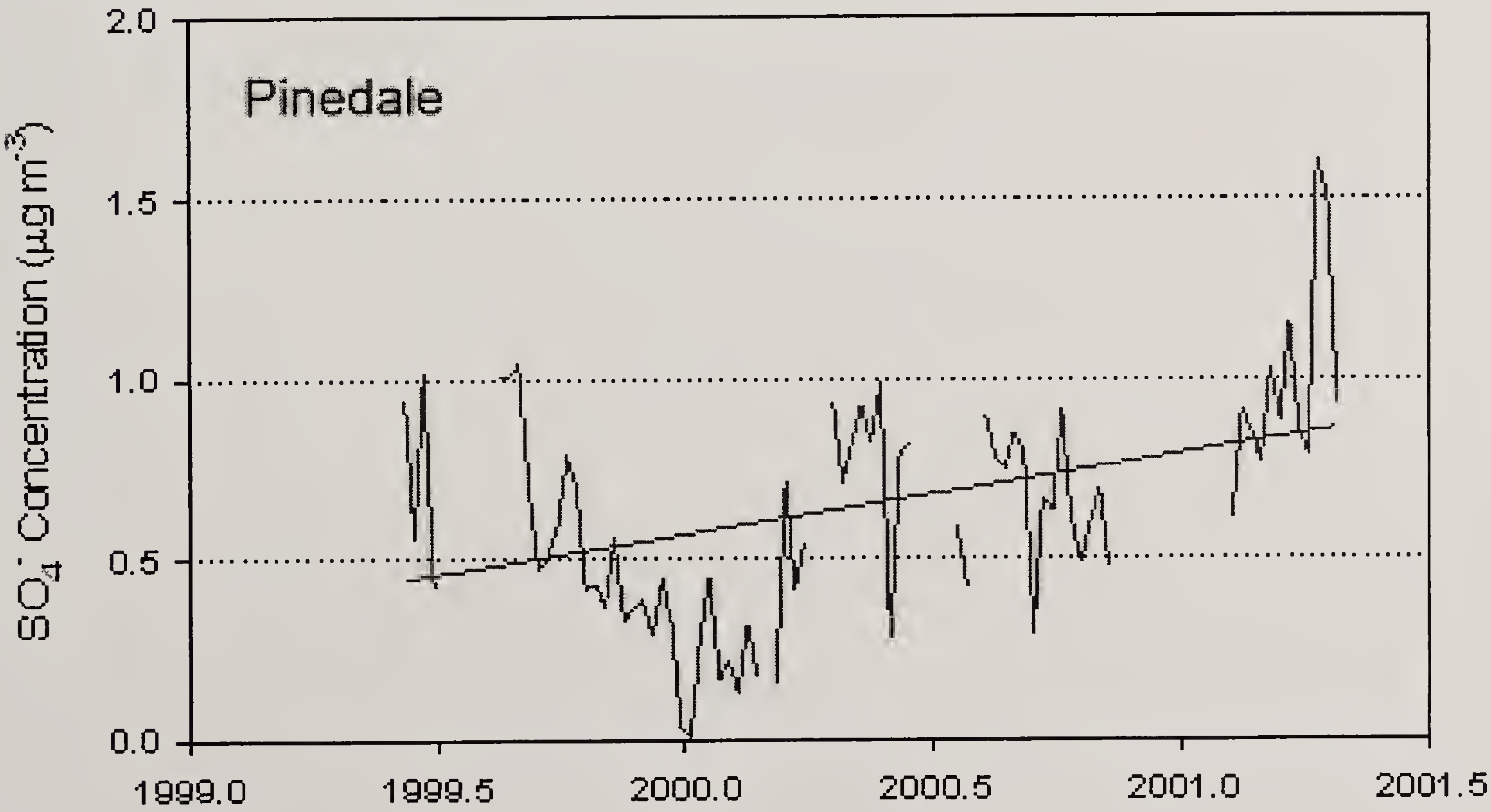
P-Figure 3.1-8a Mean Annual Concen

Figure 3.1-9a, b. Weekly Concentrations of SO_2.



Source: WARMS.

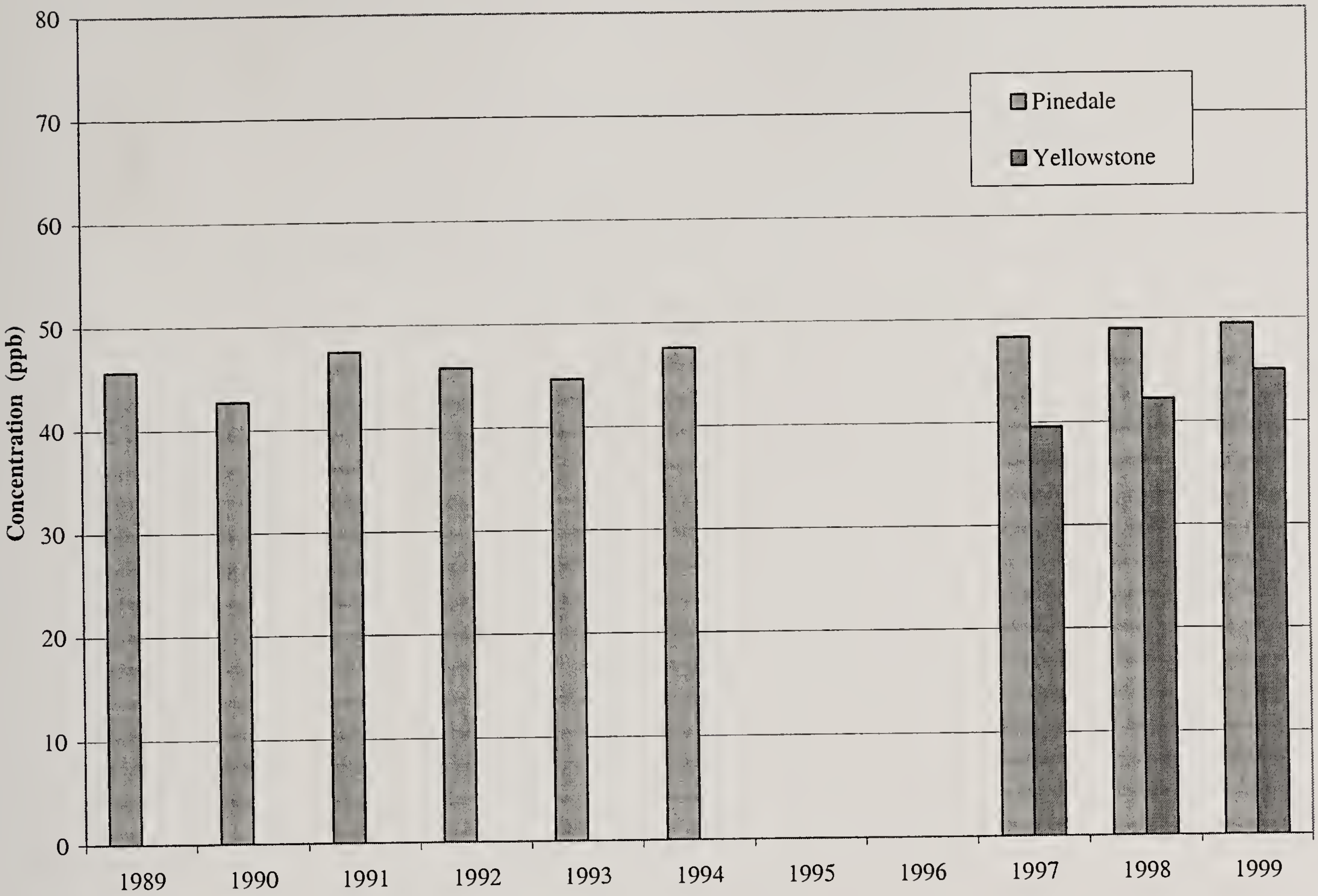
Figure 3.1-9b. Weekly Concentrations of SO_4.



Source: WARMS.

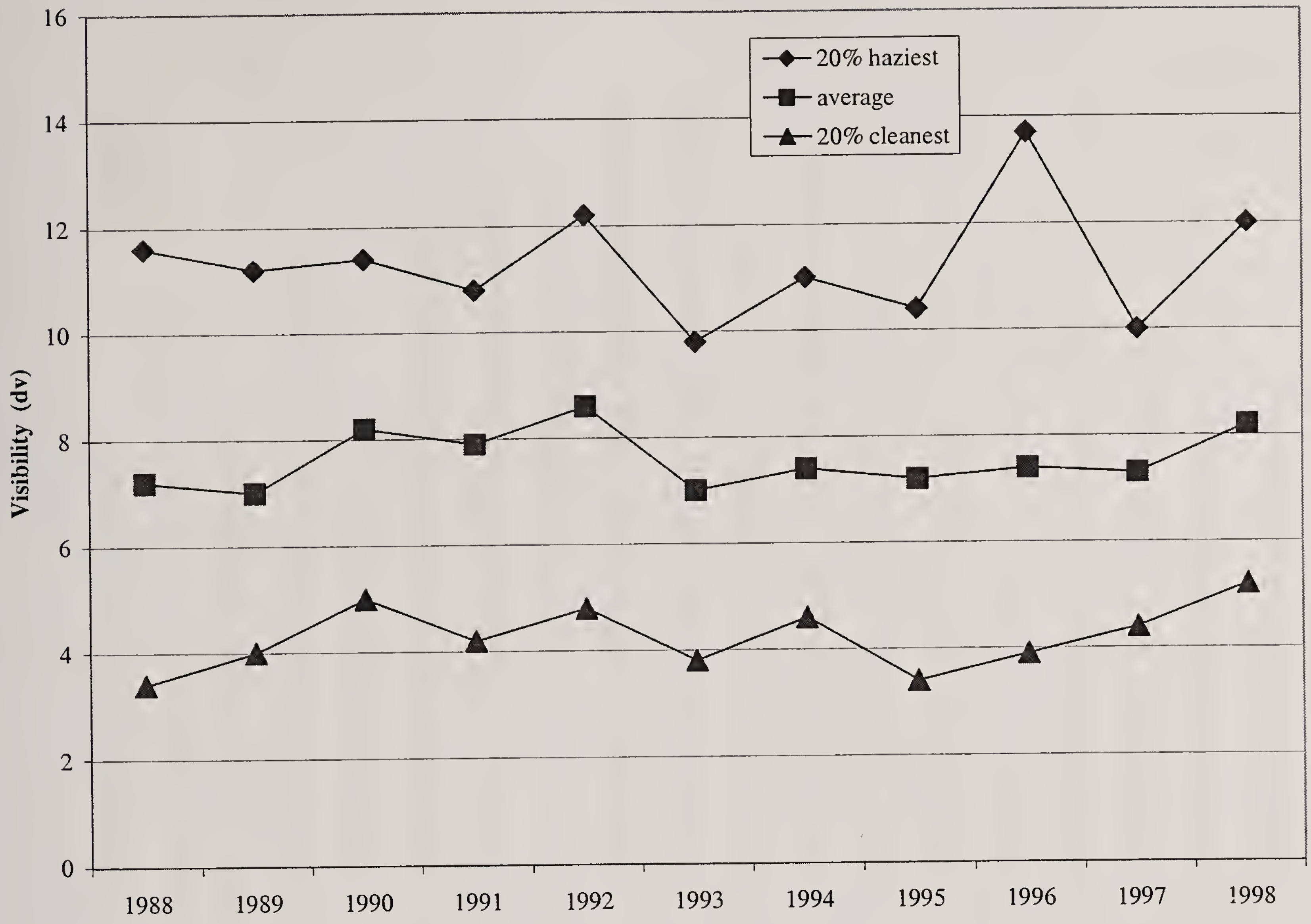
P-Figure 3.1-9a Weekly Concen

Figure 3.1-10. Mean Annual Ozone Concentrations in the Pinedale Region.



Source: CASTNet.

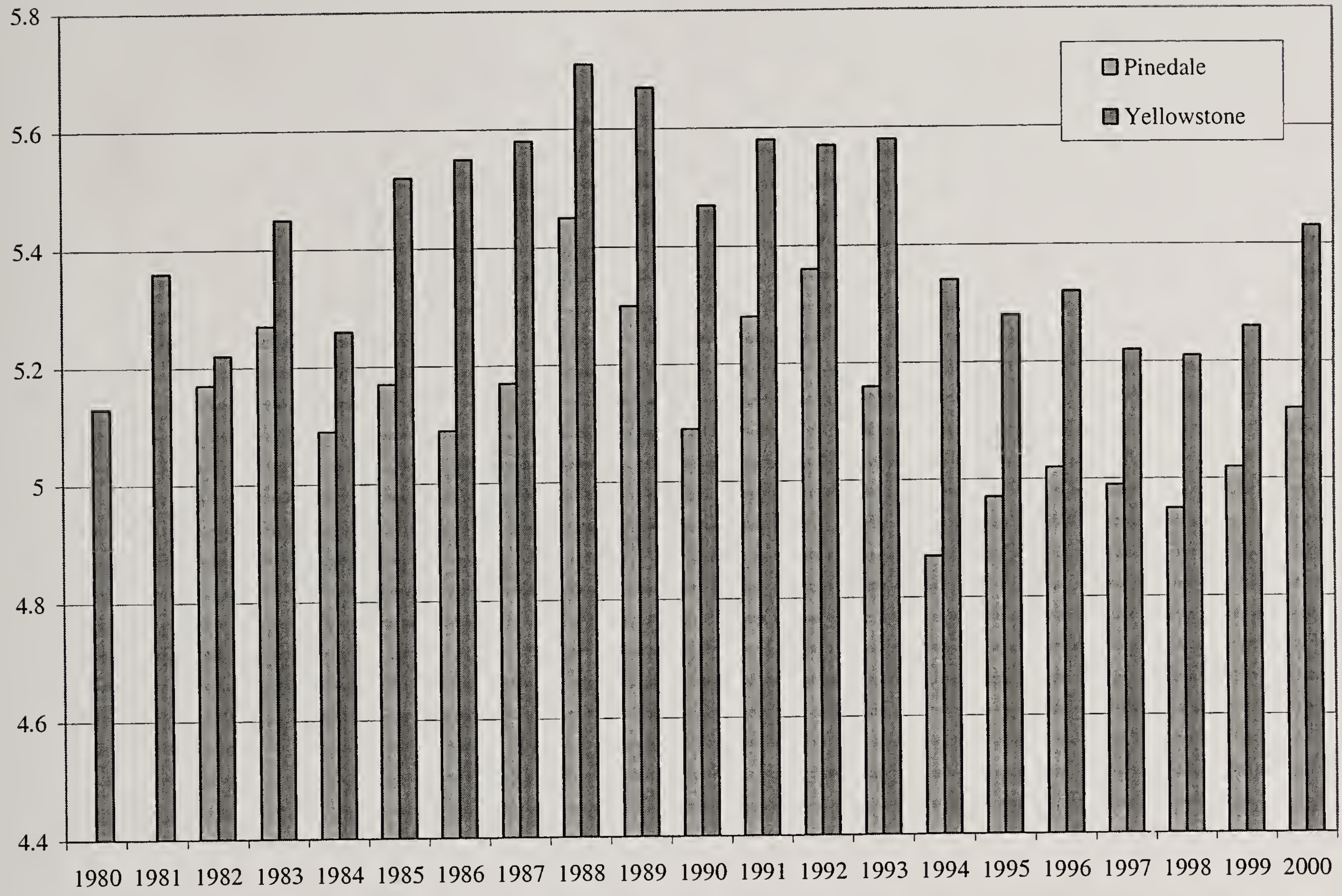
Figure 3.1-11. Visibility in Bridger Wilderness.



Source: IMPROVE.

P-Figure 3.1-11 Visibility

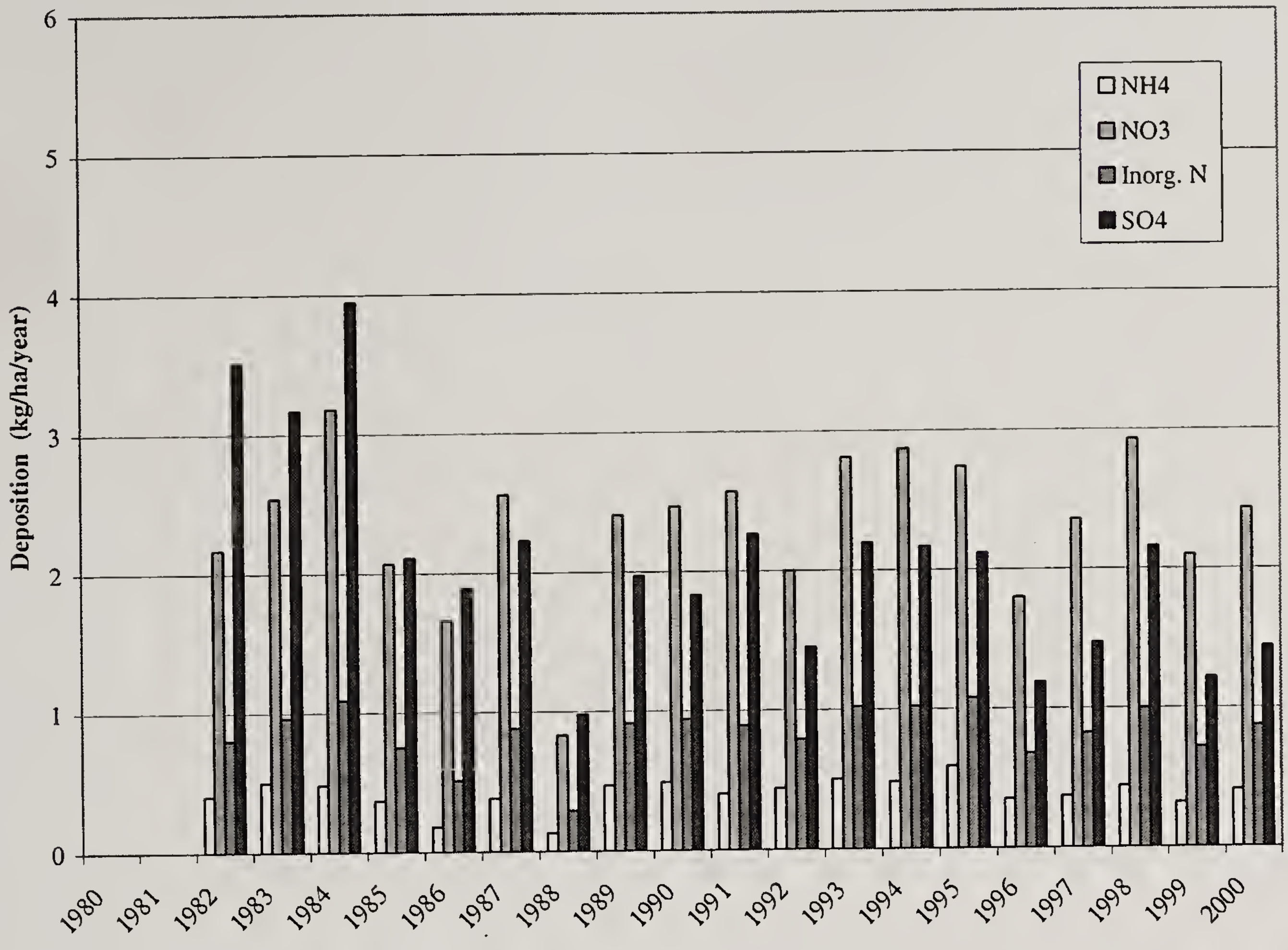
Figure 3.1-12. Mean Annual Precipitation pH in the Pinedale Region.



Source: NADP WY06 (Pinedale) and WY08 (Yellowstone).

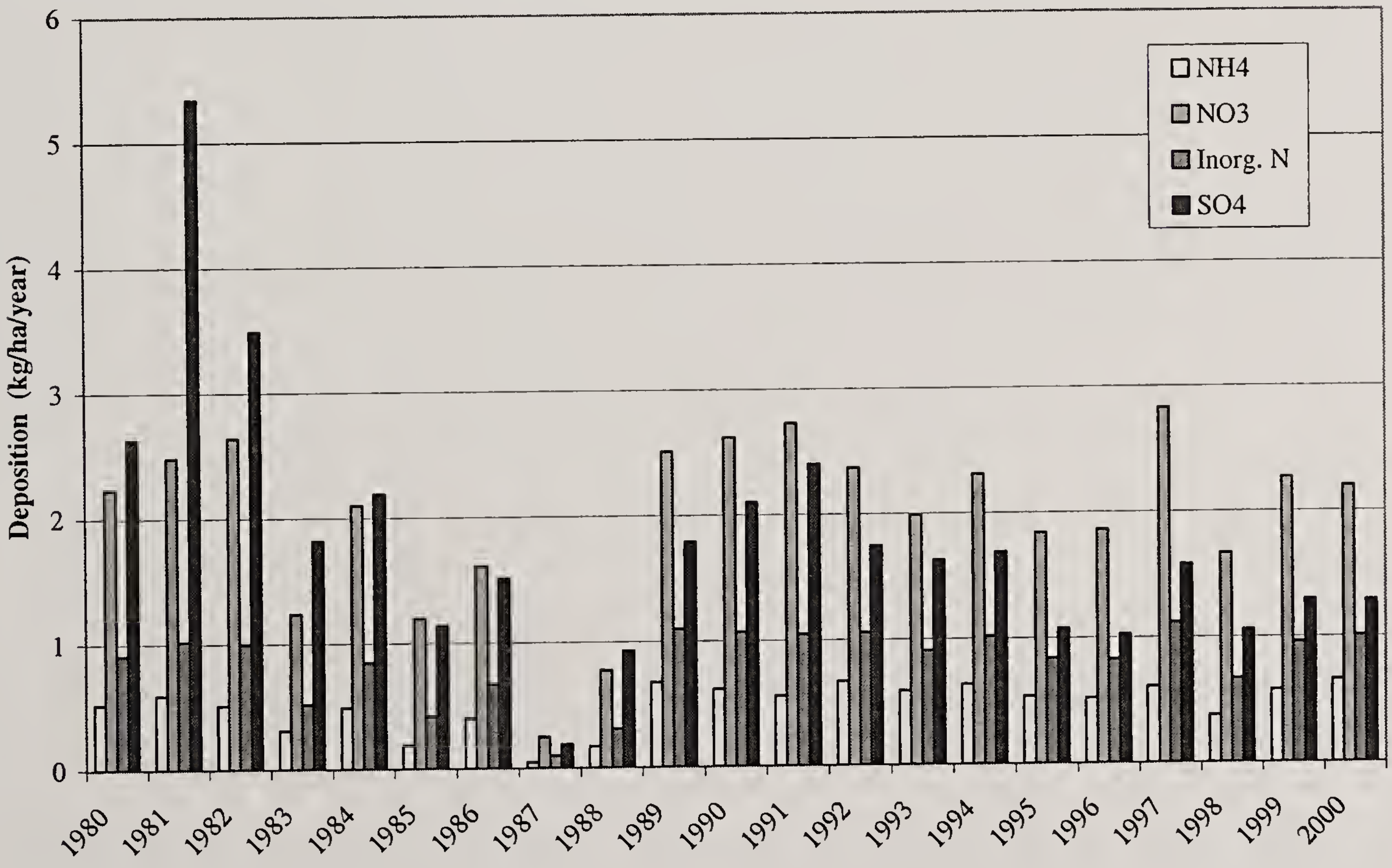
P-Figure 3.1-13 Precip ph

Figure 3.1-13a. Mean Annual Wet Deposition in Pinedale, Wyoming.



Source: NADP WY06 (Pinedale).

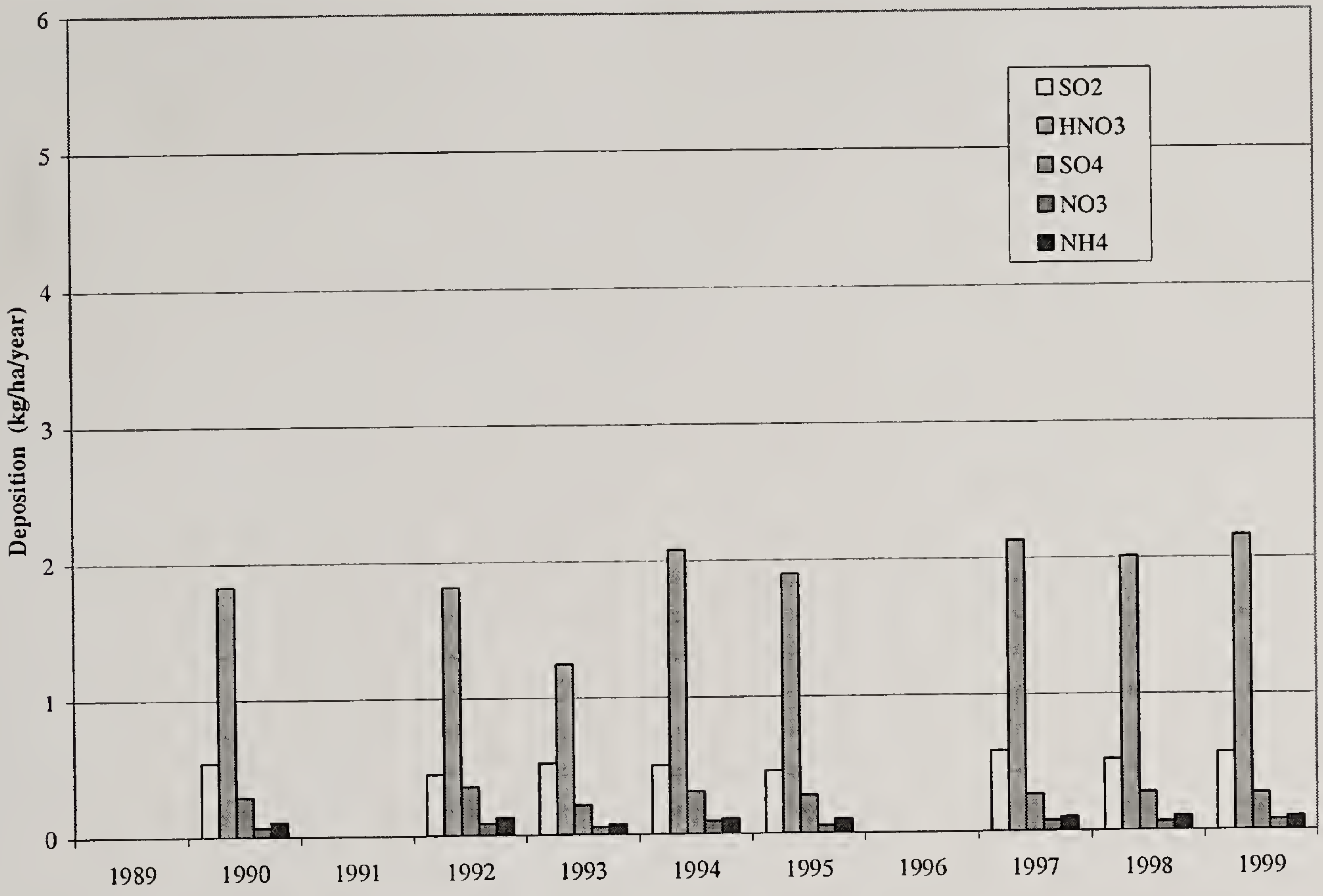
Figure 3.1-13b. Mean Annual Wet Deposition in Yellowstone National Park.



Source: NADP WY08 (Yellowstone).

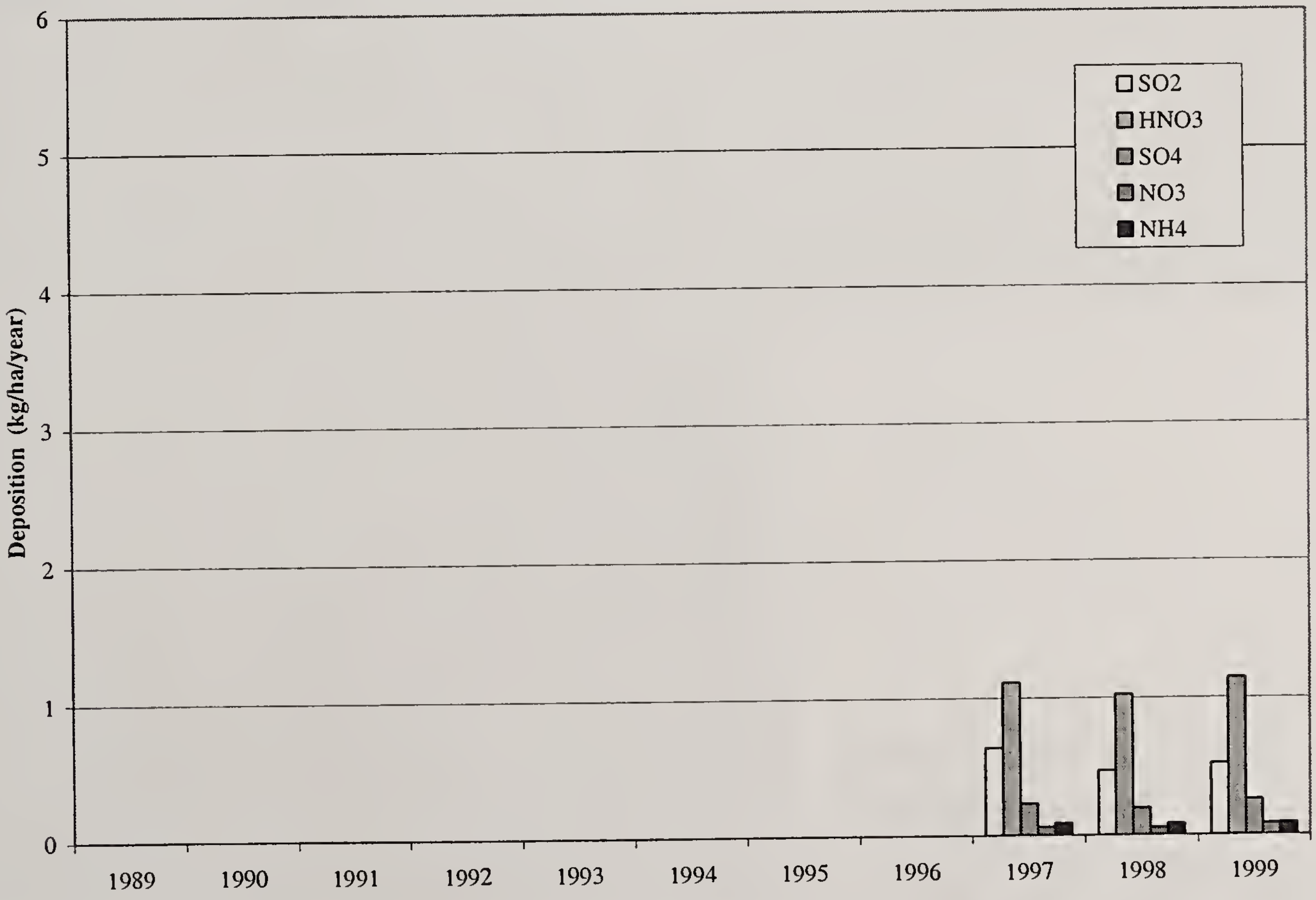
P-Figure 3.1-13a Annual Wet

Figure 3.1-14a. Mean Annual Dry Deposition in Pinedale, Wyoming.



Source: CASTNet.

Figure 3.1-14b. Mean Annual Dry Deposition in Yellowstone National Park.



Source: CASTNet.

P-Figure 3.1-14a Dry Deposition

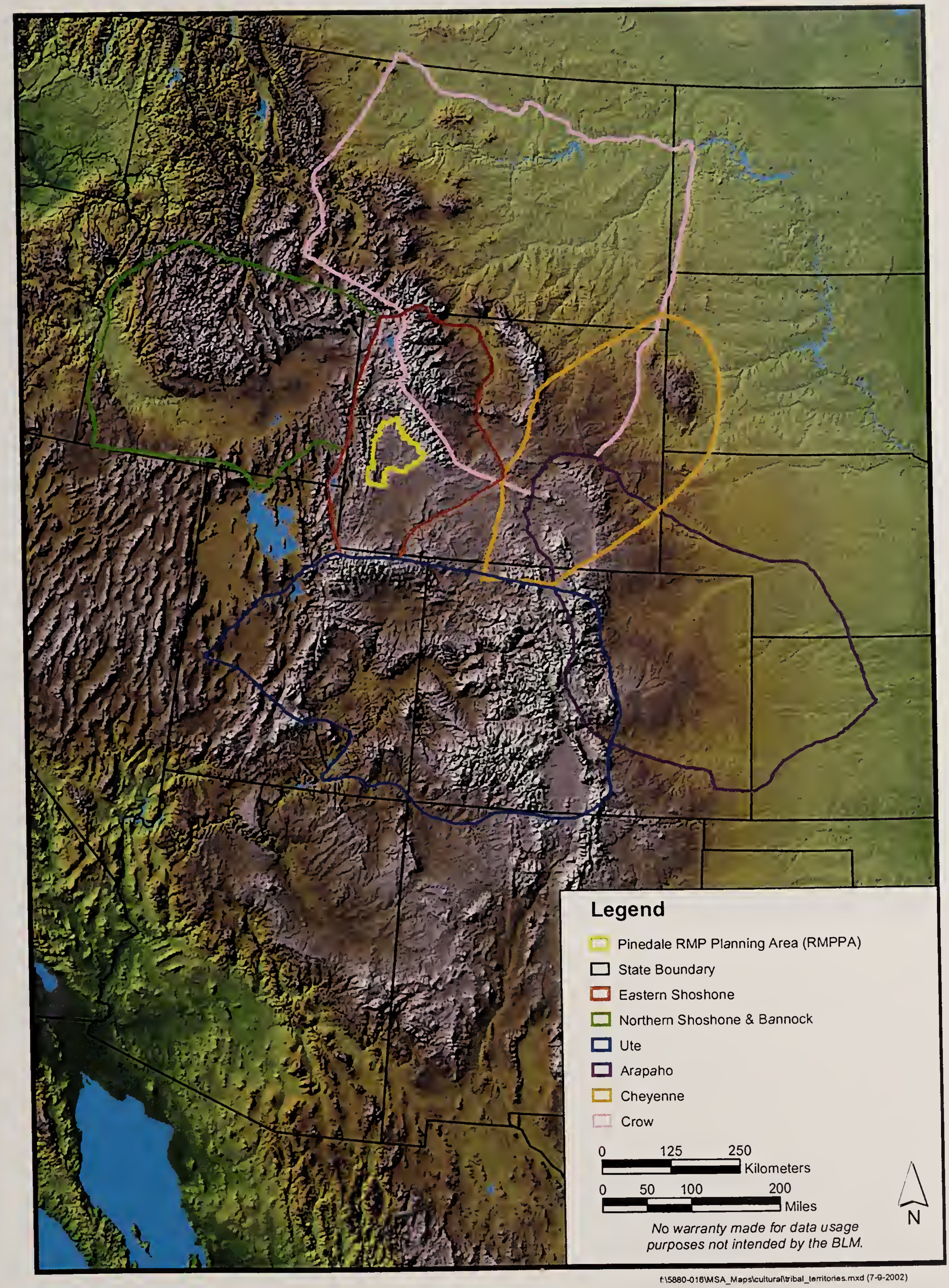

Legend
Pinedale RMP Planning Area (RMPPA)
State Boundary
Eastern Shoshone
Northern Shoshone & Bannock
Ute
Arapaho
Cheyenne
Crow
0 125 250 Kilometers
0 50 100 200 Miles
N
No warranty made for data usage purposes not intended by the BLM.

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Figure 3.2-1. Territories for Tribes in the Great Basin and Plains Areas.

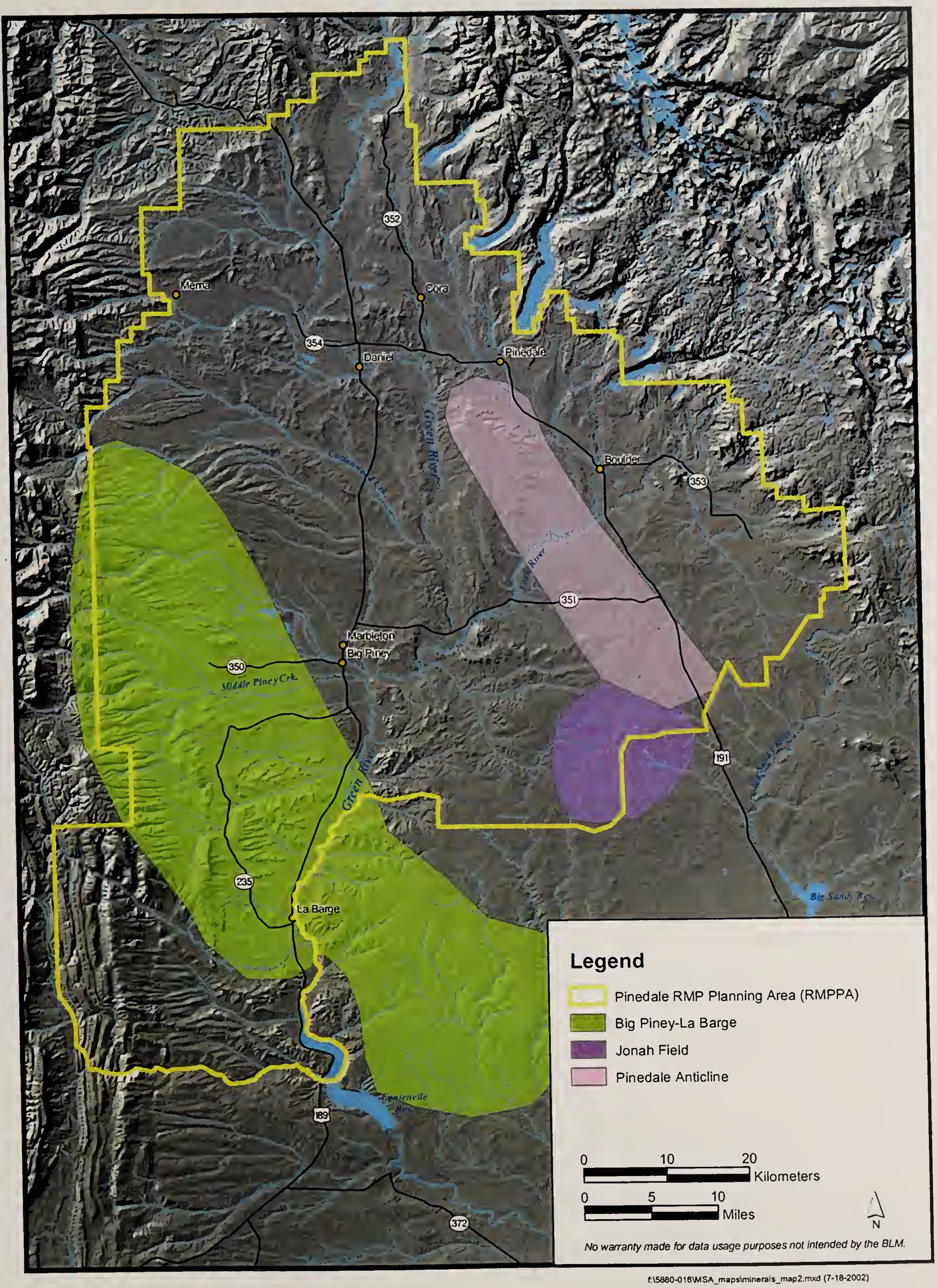
Mema
Cora
352
354
Daniel
Pinedale
Green River
Cottonwood Crk.
Boulder
353
New Fork River
351
Marbleton
Big Piney
350
Middle Piney Crk.
191
Big Sandy River
Green River
235
La Barge
Big Sandy Res.
189
Fontenelle Res.
372
Legend
Pinedale RMP Planning Area (RMPPA)
Big Piney-La Barge
Jonah Field
Pinedale Anticline
0
10
20
Kilometers
0
5
10
Miles
N
No warranty made for data usage purposes not intended by the BLM.

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Figure 3.5-1. Major Oil and Gas Field Locations.

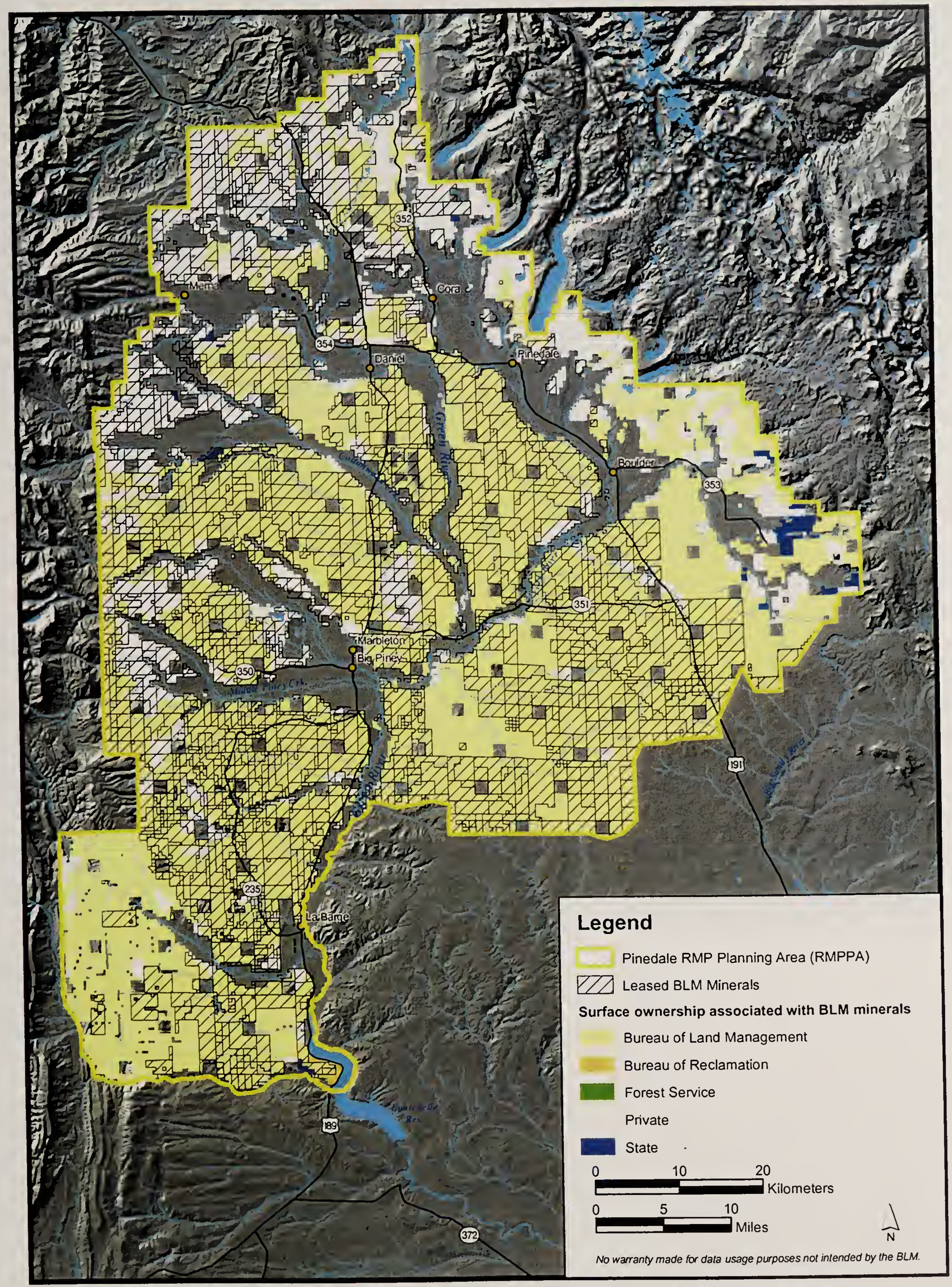
Legend
Pinedale RMP Planning Area (RMPPA)
Leased BLM Minerals
Surface ownership associated with BLM minerals
Bureau of Land Management
Bureau of Reclamation
Forest Service
Private
State
0
10
20
Kilometers
0
5
10
Miles
N
No warranty made for data usage purposes not intended by the BLM.
Merna
Cora
Daniel
Pinedale
Boulder
Marbleton
Big Piney
La Barge
Green River
352
354
353
351
350
235
191
189
372

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Figure 3.7-2. Mineral Ownership and Leased Federal Lands.

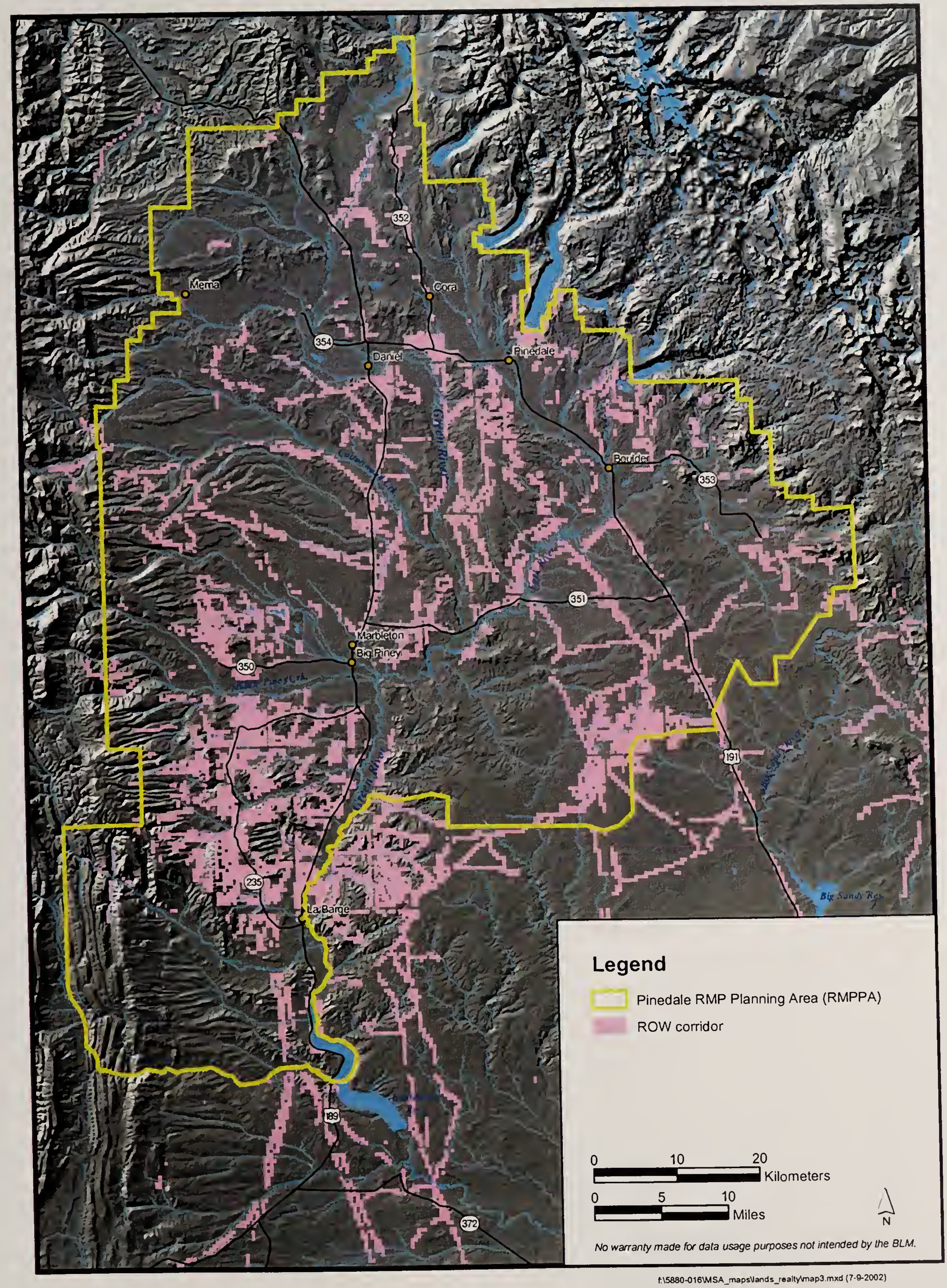
Merna
Cora
352
354
Daniel
Pinedale
Boulder
353
351
Marbleton
Big Piney
350
235
La Barge
191
189
372
Big Sandy Res.
Legend
Pinedale RMP Planning Area (RMPPA)
ROW corridor
0
10
20
Kilometers
0
5
10
Miles
N
No warranty made for data usage purposes not intended by the BLM.

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Figure 3.7-3. Right-of-Way Corridors.

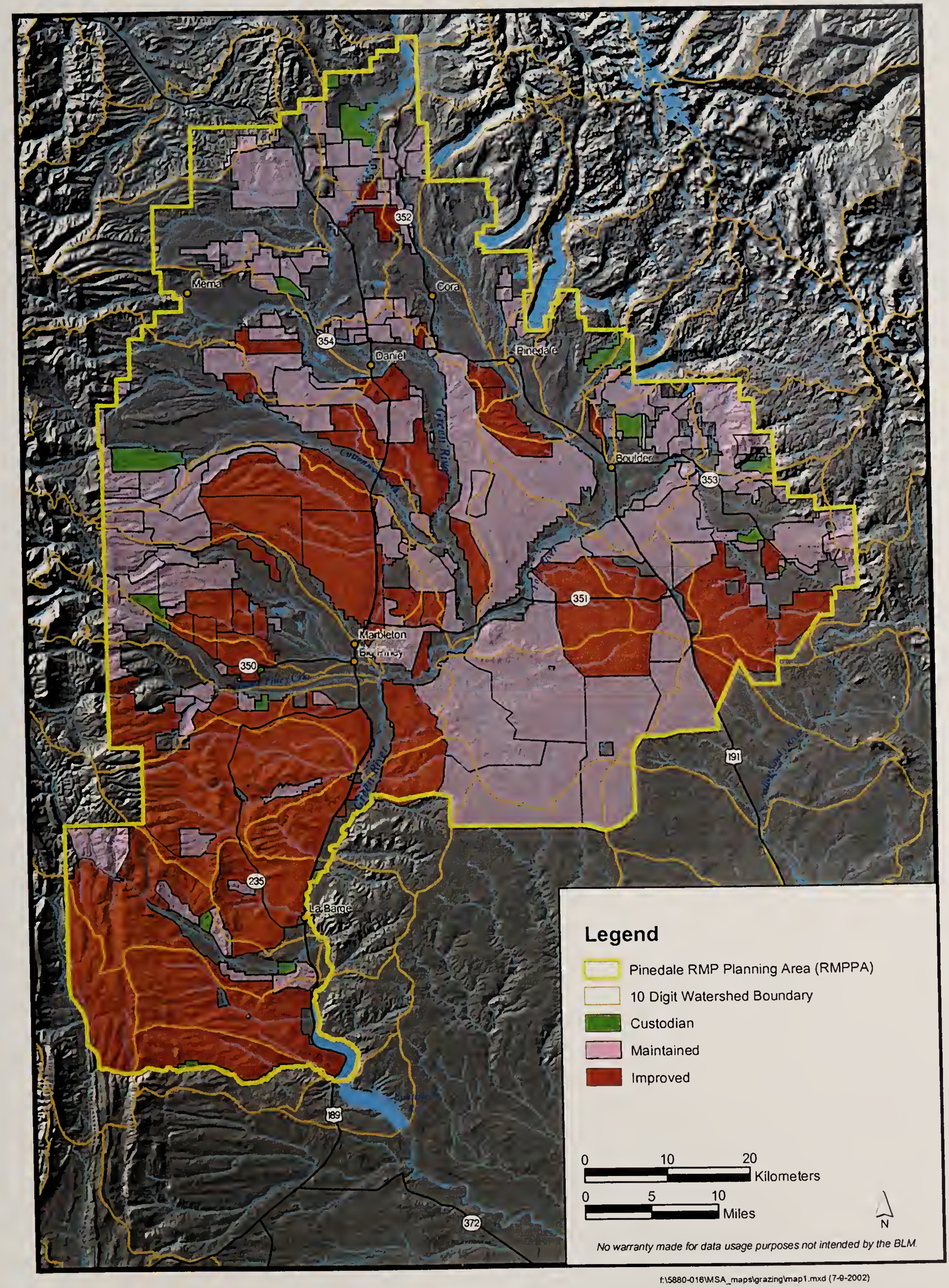
Mema
Cora
352
354
Daniel
Pinedale
Green River
Boulder
353
351
Marbleton
Big Piney
350
191
235
La Barge
189
372
Legend
Pinedale RMP Planning Area (RMPPA)
10 Digit Watershed Boundary
🟩 Custodian
Maintained
🟥 Improved
0
10
20
Kilometers
0
5
10
Miles
N

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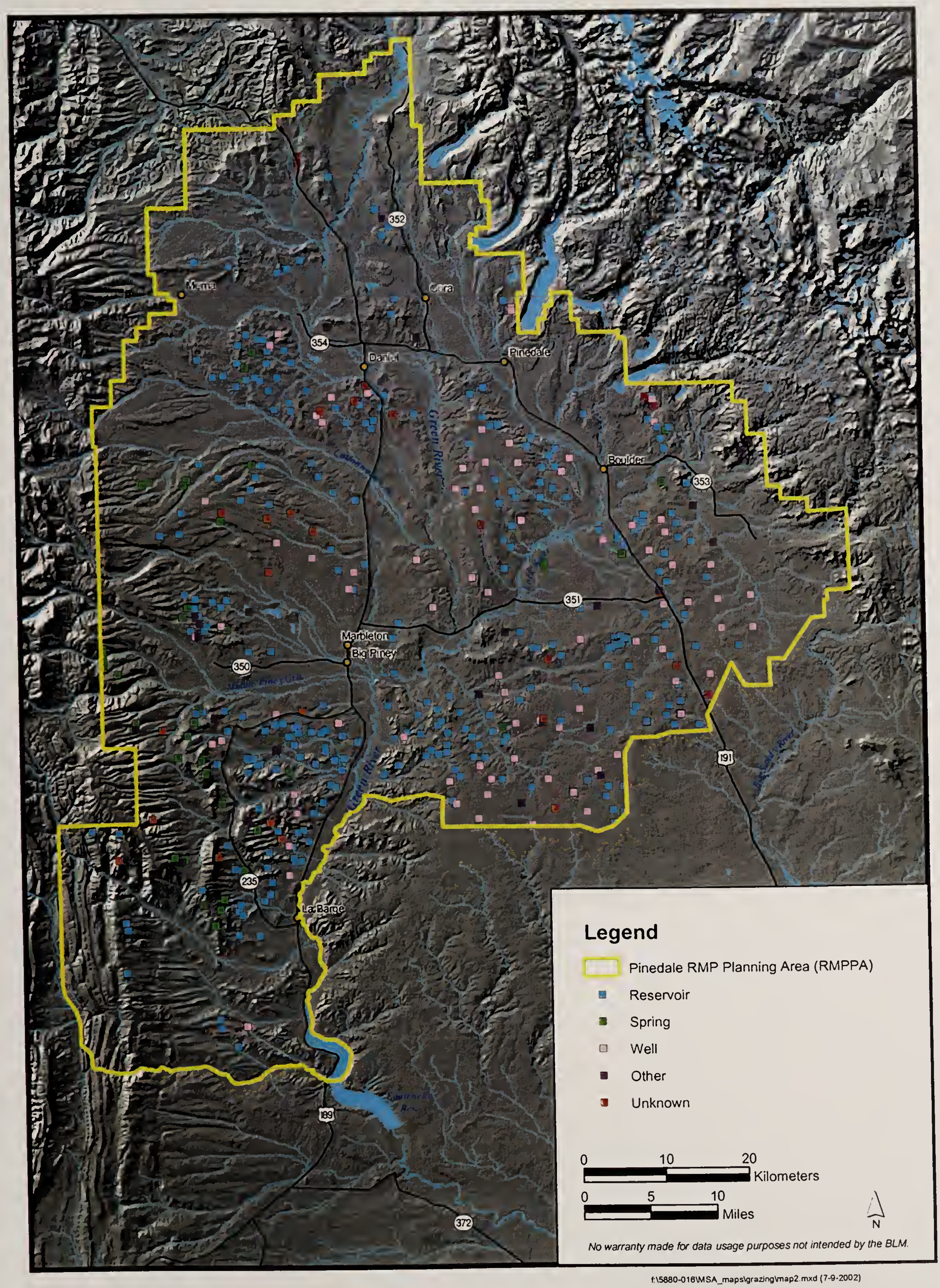
Figure 3.8-1. Allotments by Management Category in 1988.


352
Merna
Cora
354
Daniel
Pinedale
Green River
Boulder
353
351
Marbleton
Big Piney
350
191
Green River
235
La Barge
189
372
Legend
Pinedale RMP Planning Area (RMPPA)
Reservoir
Spring
Well
Other
Unknown
0
10
20
Kilometers
0
5
10
Miles
N

No warranty made for data usage purposes not intended by the BLM.

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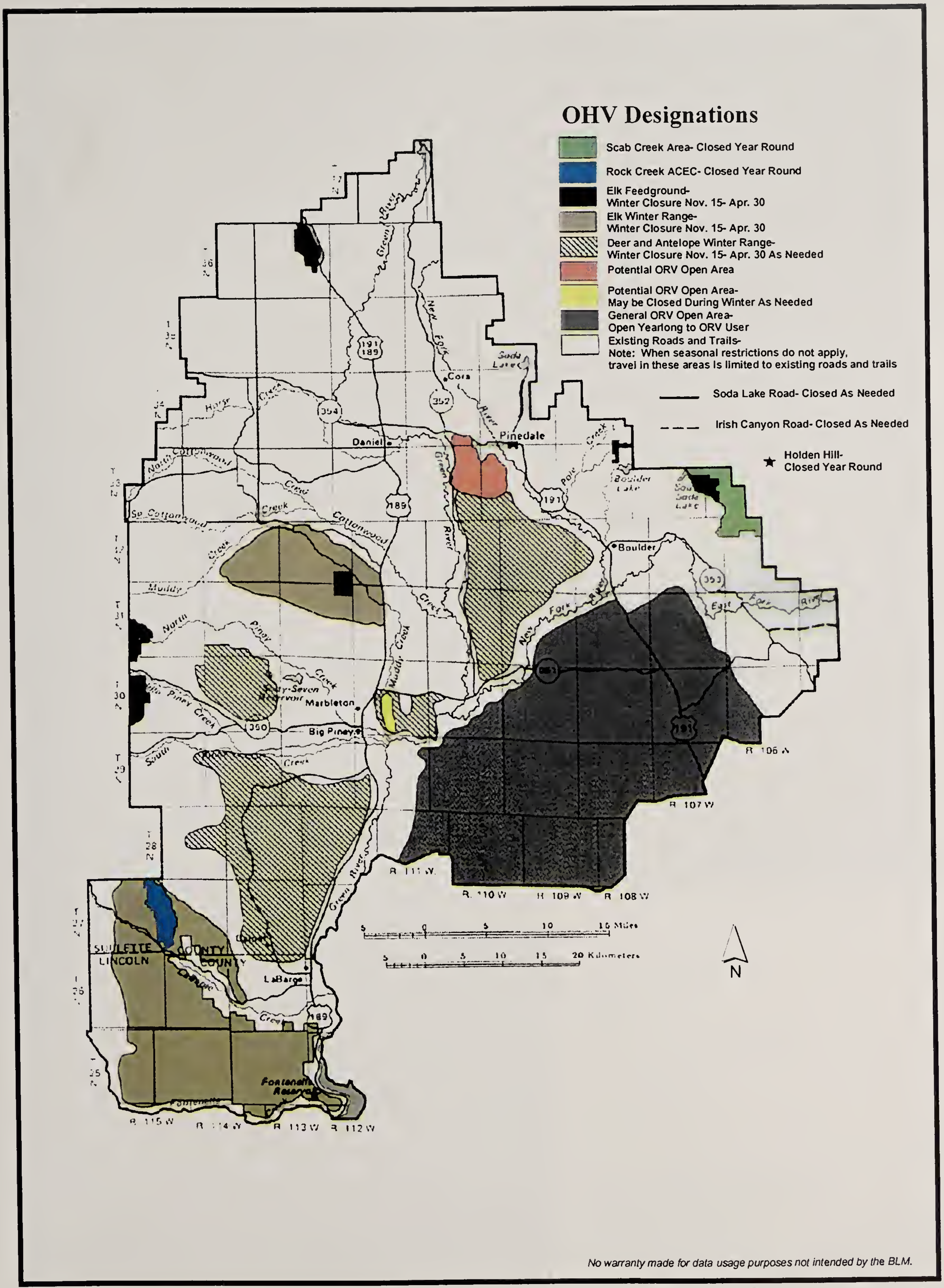
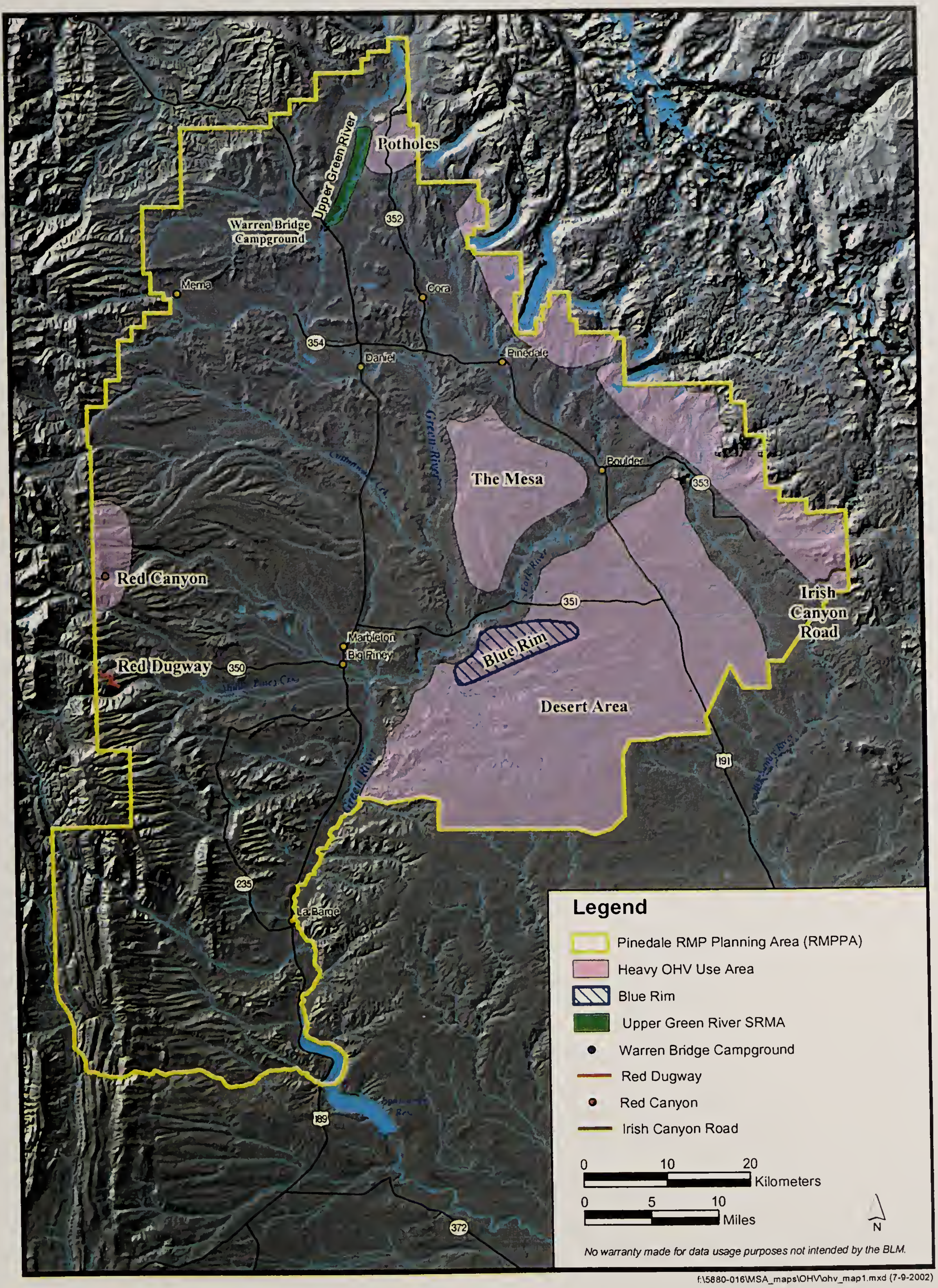
Figure 3.8-2. Water Sources in 1996.


OHV Designations
Scab Creek Area- Closed Year Round
Rock Creek ACEC- Closed Year Round
Elk Feedground- Winter Closure Nov. 15- Apr. 30
Elk Winter Range- Winter Closure Nov. 15- Apr. 30
Deer and Antelope Winter Range- Winter Closure Nov. 15- Apr. 30 As Needed
Potential ORV Open Area
Potential ORV Open Area- May be Closed During Winter As Needed
General ORV Open Area- Open Yearlong to ORV User
Existing Roads and Trails- Note: When seasonal restrictions do not apply, travel in these areas is limited to existing roads and trails
Soda Lake Road- Closed As Needed
Irish Canyon Road- Closed As Needed
Holden Hill- Closed Year Round
Pinedale
Cora
Daniel
Boulder
Marbleton
Big Piney
LaBarge
Soda Lake
Boulder Lake
Fontenelle Reservoir
SUBLETTE COUNTY
LINCOLN COUNTY
191
189
354
352
353
350
R 106 W
R 107 W
R 108 W
R 109 W
R 110 W
R 111 W
R 112 W
R 113 W
R 114 W
R 115 W
Miles
Kilometers
N

No warranty made for data usage purposes not intended by the BLM.

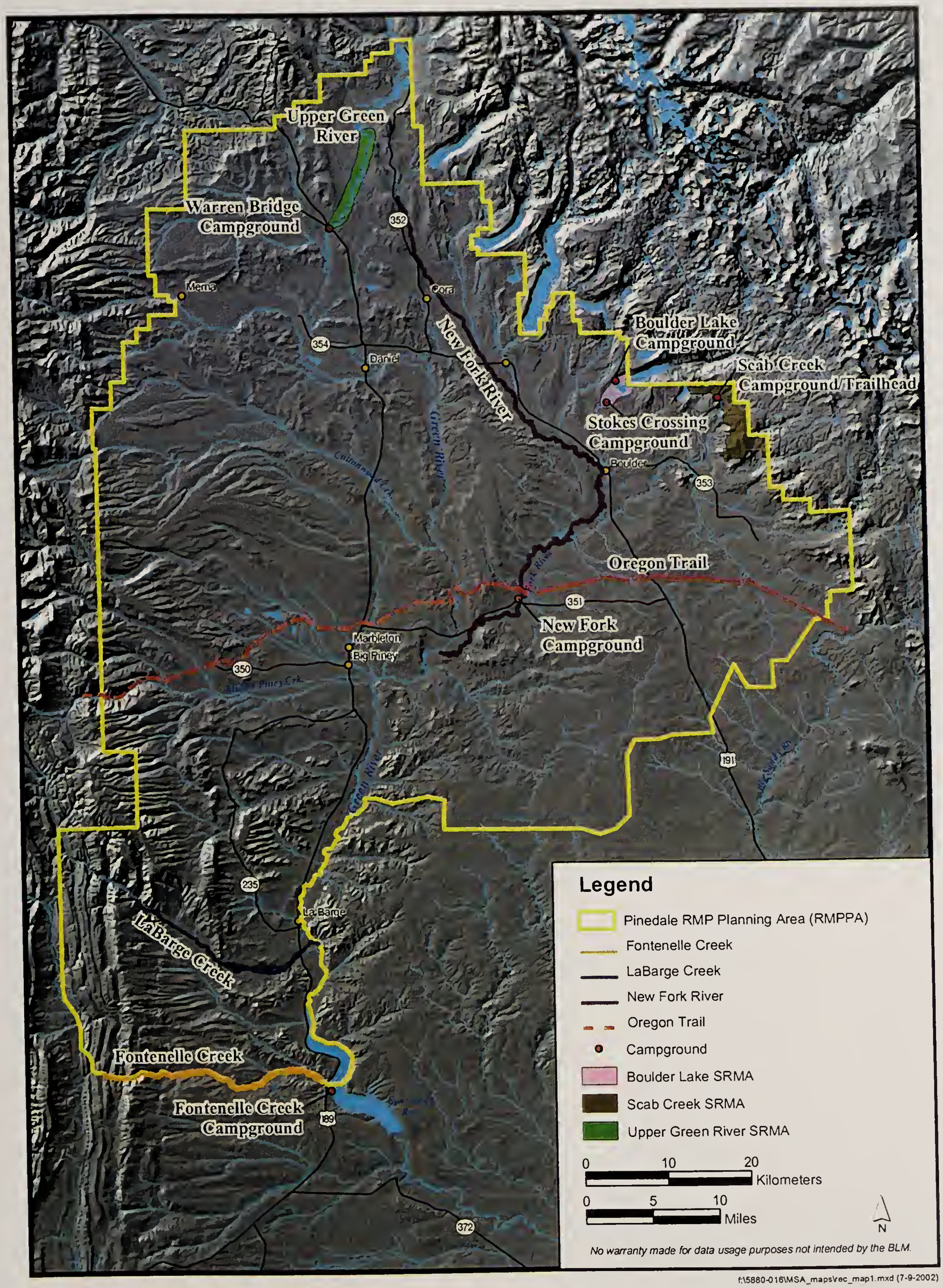
f:\5880-016\MSA_maps\ohv_map2.mxd (7-9-2002)

Figure 3.9-1. OHV Designations.


Potholes
Upper Green River
Warren Bridge Campground
352
Mema
Cora
354
Daniel
Pinedale
Green River
Boulder
353
The Mesa
Red Canyon
351
Irish Canyon Road
Marbleton
Big Piney
Blue Rim
Red Dugway
350
Desert Area
191
Green River
235
La Barge
189
372
Legend
Pinedale RMP Planning Area (RMPPA)
Heavy OHV Use Area
Blue Rim
Upper Green River SRMA
Warren Bridge Campground
Red Dugway
Red Canyon
Irish Canyon Road
0
10
20
Kilometers
0
5
10
Miles
N
No warranty made for data usage purposes not intended by the BLM.

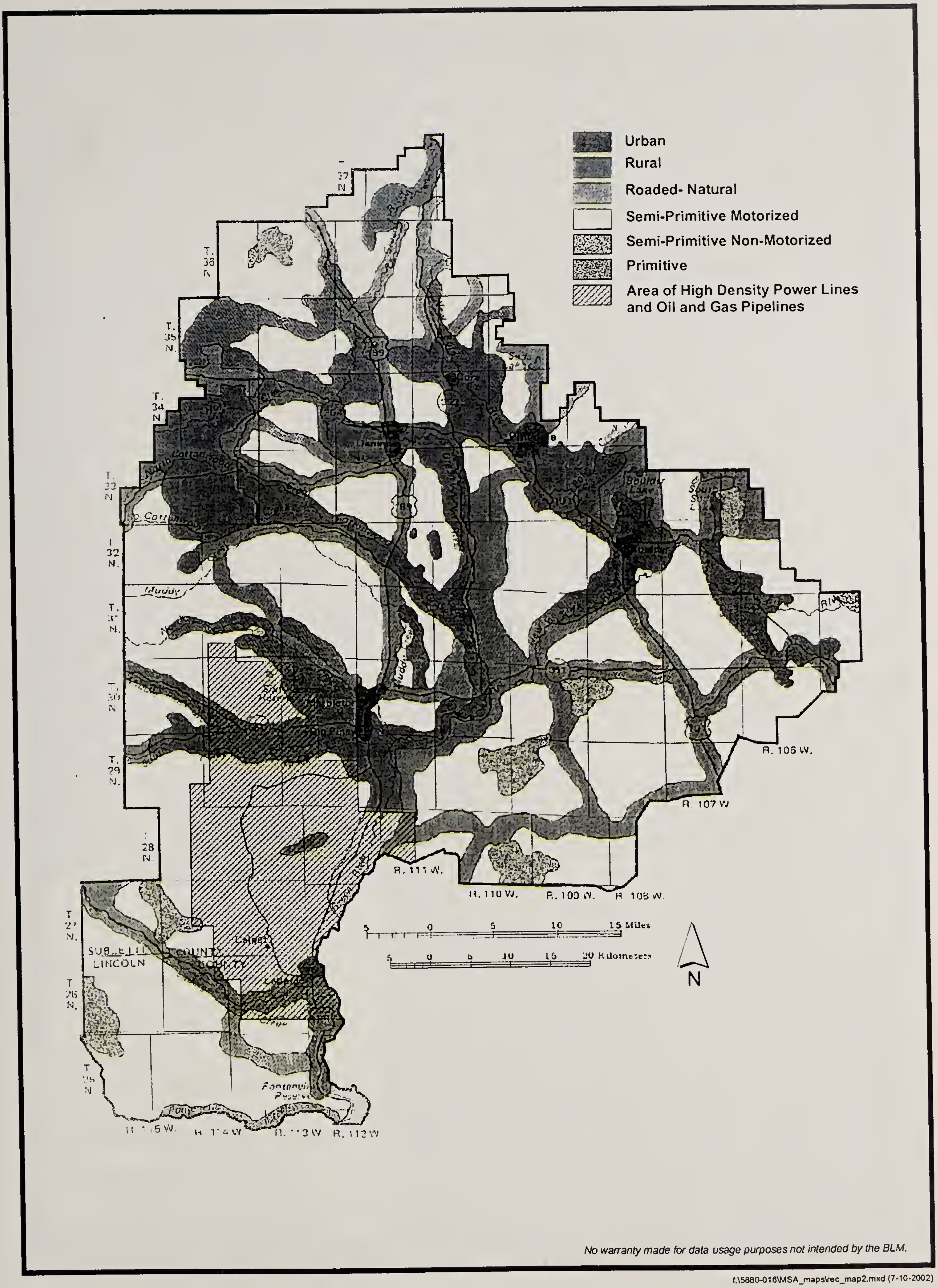
f:\5880-016\MSA_maps\OHV\ohv_map1.mxd (7-9-2002)

Figure 3.9-2. OHV Conflict Areas.


Upper Green River
Warren Bridge Campground
352
Merna
Cora
354
Daniel
New Fork River
Green River
Cottonwood Crk
Boulder Lake Campground
Scab Creek Campground/Trailhead
Stokes Crossing Campground
Boulder
353
Oregon Trail
351
New Fork Campground
Marbleton
Big Piney
350
Piney Crk
191
Green River
235
La Barge
LaBarge Creek
Fontenelle Creek
Fontenelle Creek Campground
189
372
Legend
Pinedale RMP Planning Area (RMPPA)
Fontenelle Creek
LaBarge Creek
New Fork River
Oregon Trail
Campground
Boulder Lake SRMA
Scab Creek SRMA
Upper Green River SRMA
0
10
20
Kilometers
0
5
10
Miles
N
No warranty made for data usage purposes not intended by the BLM.

f:\5880-016\MSA_maps\rec_map1.mxd (7-9-2002)

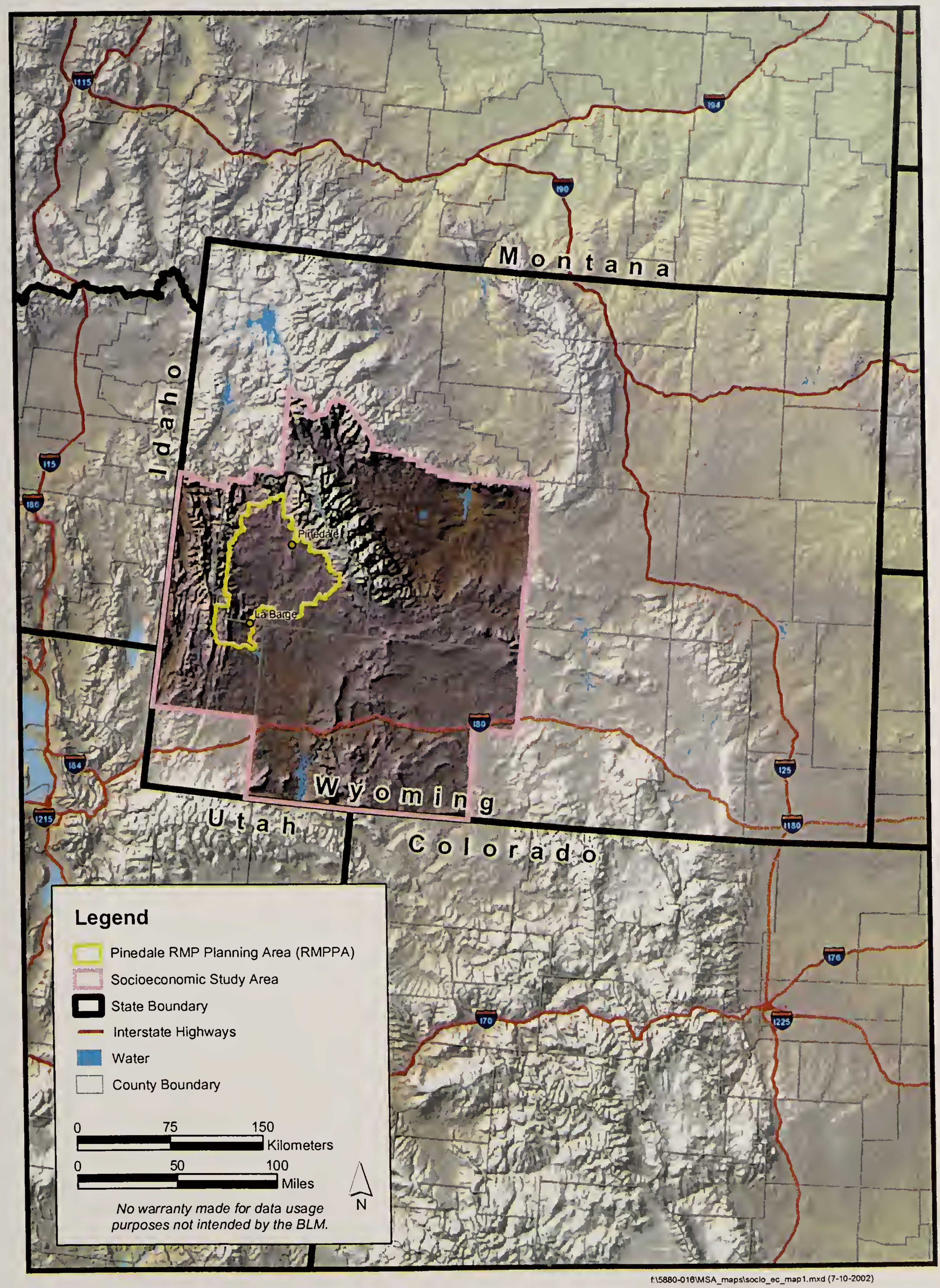
Figure 3.11-1. Recreation Resources.


Urban
Rural
Roaded- Natural
Semi-Primitive Motorized
Semi-Primitive Non-Motorized
Primitive
Area of High Density Power Lines and Oil and Gas Pipelines
T. 37 N
T. 36 N
T. 35 N.
T. 34 N
T. 33 N
T. 32 N.
T. 30 N
T. 29 N.
T. 28 N
T. 26 N.
SUBLETTE COUNTY
LINCOLN COUNTY
R. 106 W.
R. 107 W
R. 111 W.
R. 110 W.
R. 109 W.
R. 108 W.
R. 112 W
5 0 5 10 15 Miles
5 0 5 10 15 20 Kilometers
N

No warranty made for data usage purposes not intended by the BLM.

f:\5880-016\MSA_maps\rec_map2.mxd (7-10-2002)

Figure 3.11-2. Recreation Opportunity Spectrum.


I115
I94
I90
Montana
Idaho
I15
I86
Pinedale
La Barge
I80
I84
I215
I25
I180
Wyoming
Utah
Colorado
I76
I70
I225
Legend
Pinedale RMP Planning Area (RMPPA)
Socioeconomic Study Area
State Boundary
Interstate Highways
Water
County Boundary
0 75 150 Kilometers
0 50 100 Miles
N
No warranty made for data usage purposes not intended by the BLM.

f:\5880-016\MSA_maps\socio_ec_map1.mxd (7-10-2002)

Figure 3.12-1. Socioeconomic Study Area.

Figure 3.12-2. Employment by Industry 1999.

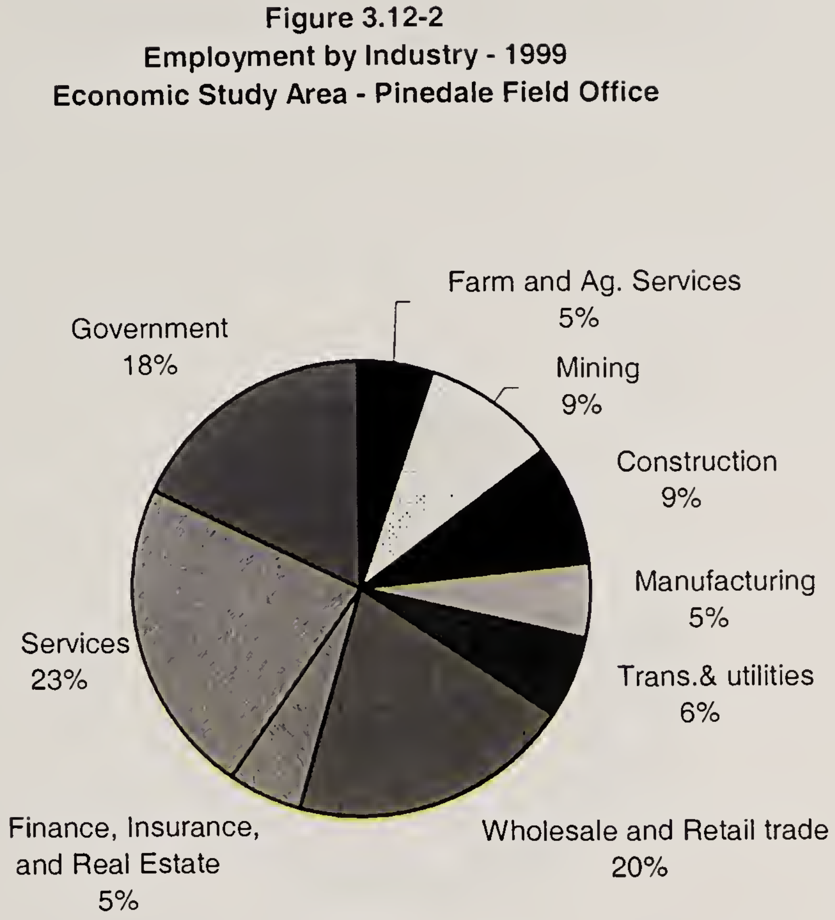


Figure 3.12-3. Percentage of Gross Earnings by Industry, 1999.

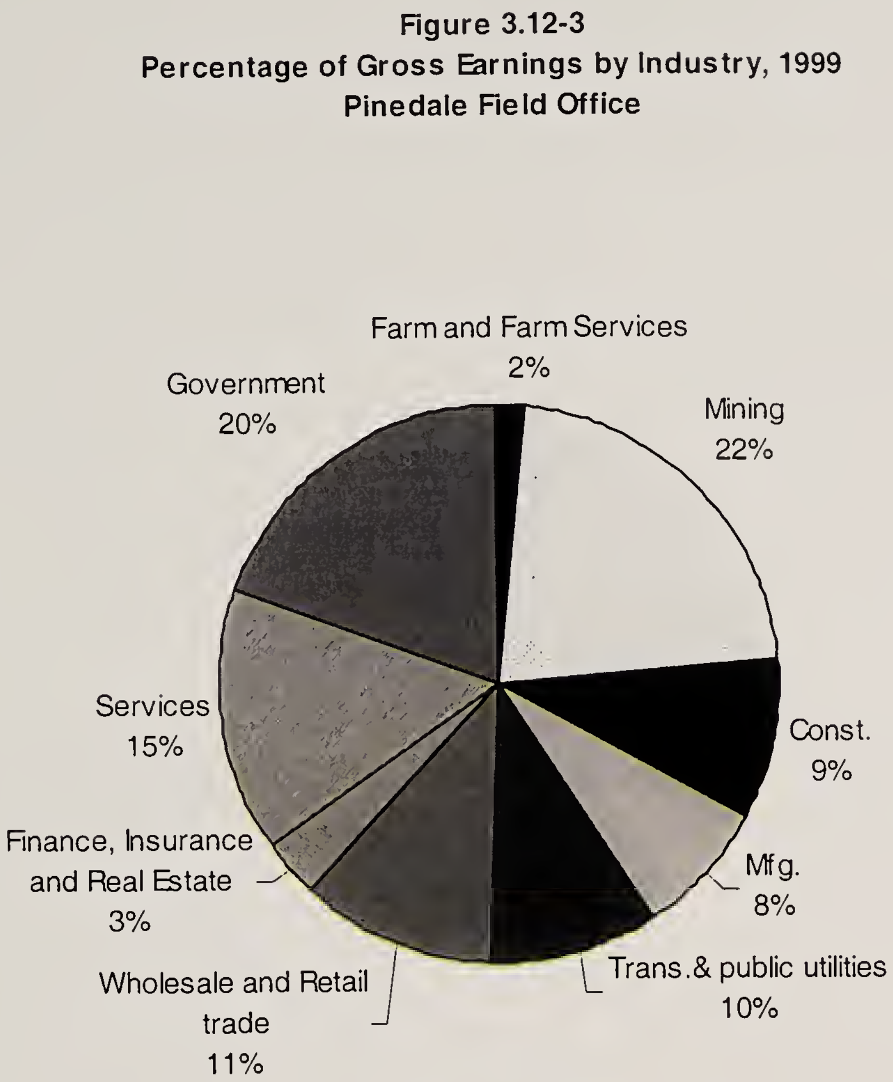


Figure 3.12-4. Historic Natural Gas Production.

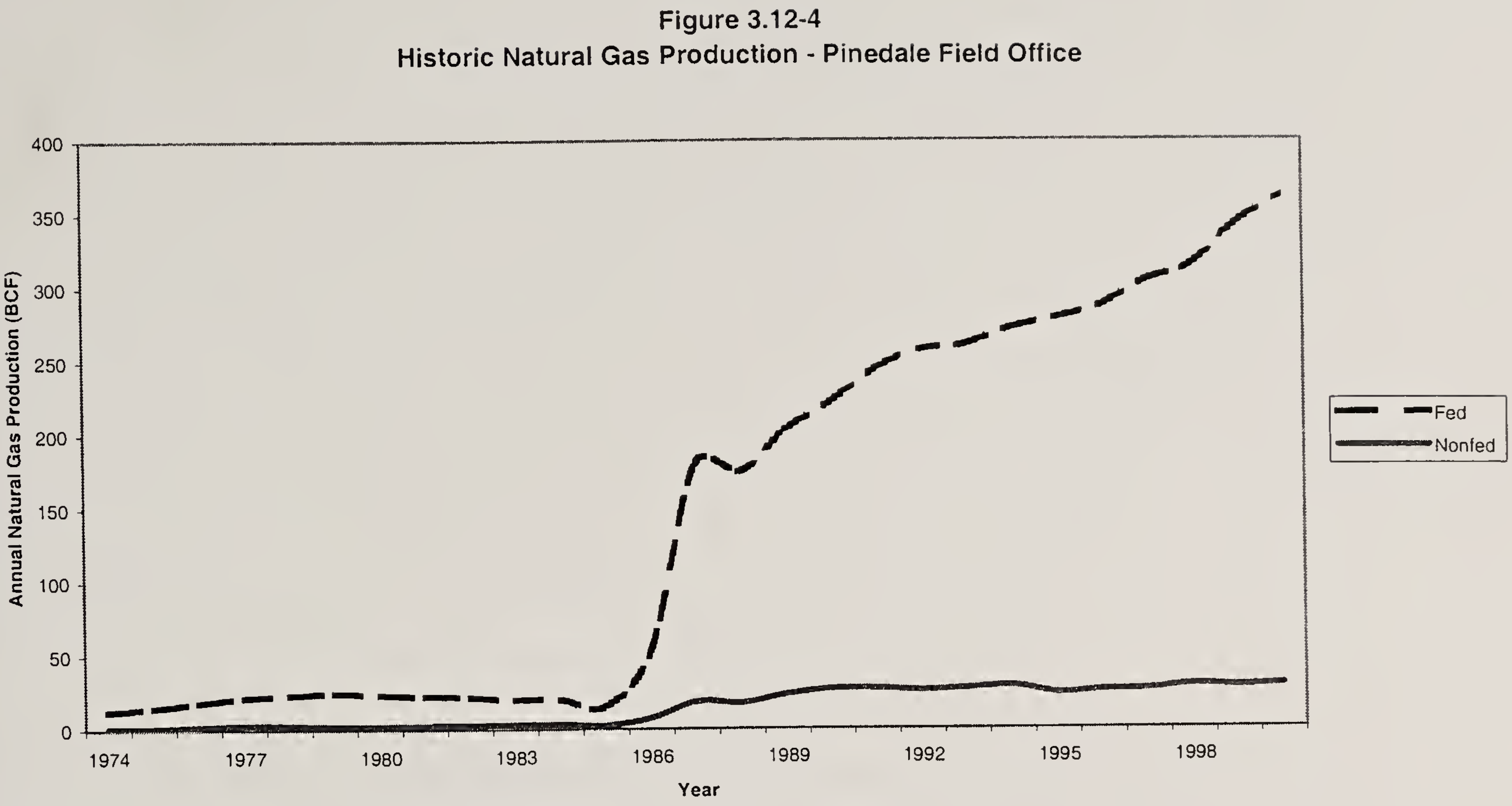
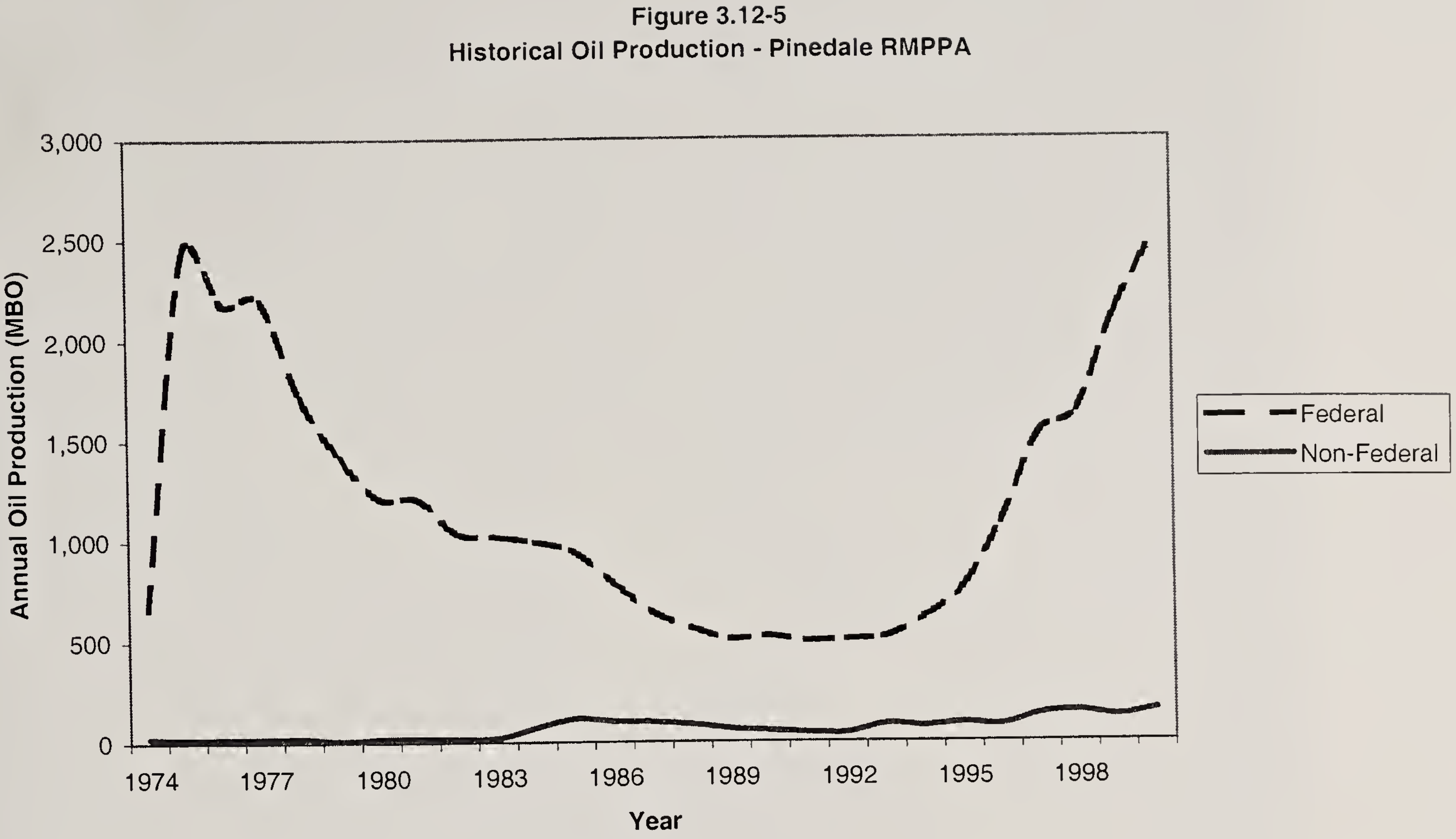
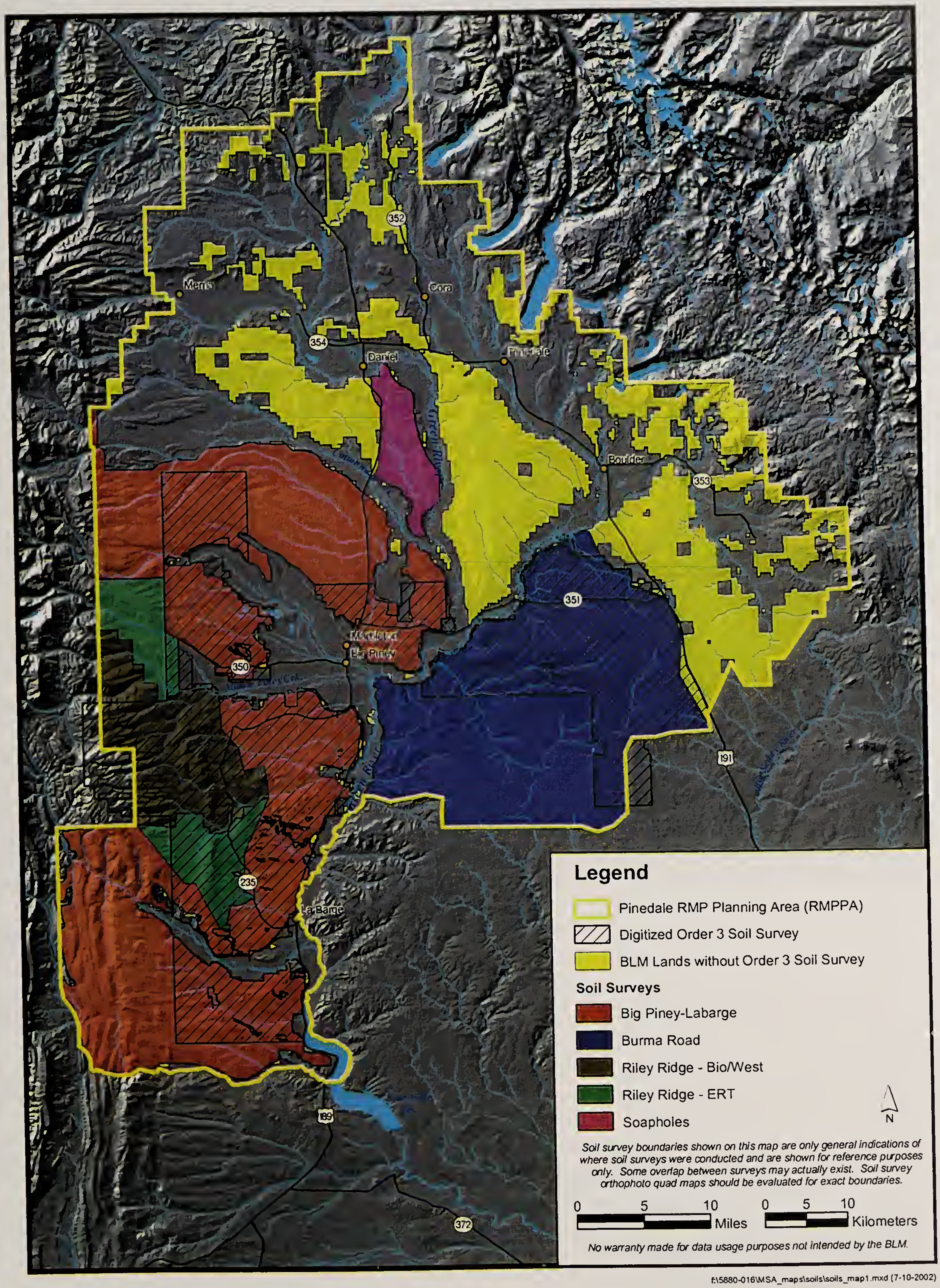


Figure 3.12-5. Historical Oil Production.



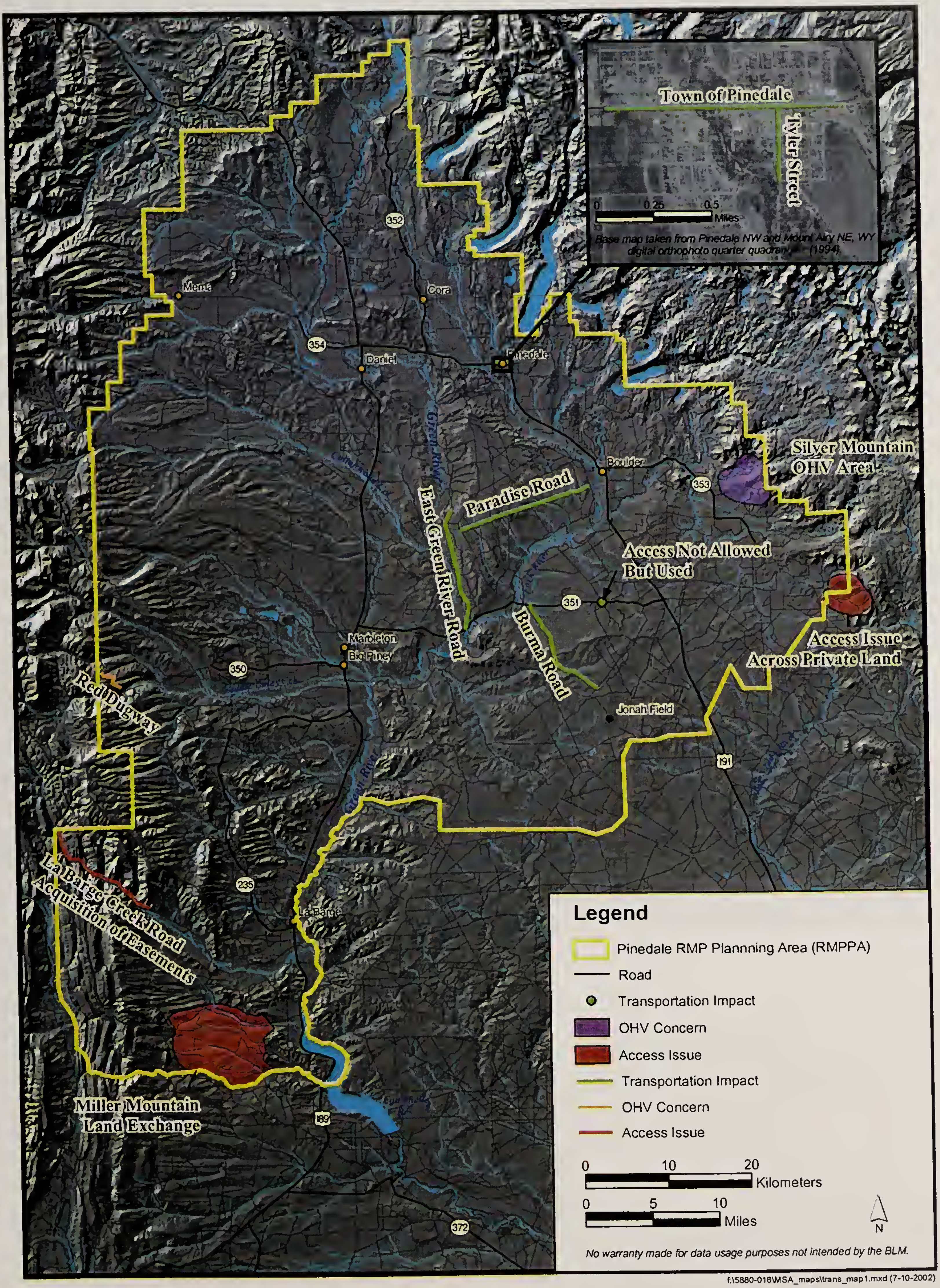

Legend
Pinedale RMP Planning Area (RMPPA)
Digitized Order 3 Soil Survey
BLM Lands without Order 3 Soil Survey
Soil Surveys
Big Piney-Labarge
Burma Road
Riley Ridge - Bio/West
Riley Ridge - ERT
Soapholes
N
0
5
10
Miles
0
5
10
Kilometers
Merna
Cora
Daniel
Pinedale
Boulder
Marbleton
Big Piney
La Barge
352
354
353
351
350
235
189
191
372

Soil survey boundaries shown on this map are only general indications of where soil surveys were conducted and are shown for reference purposes only. Some overlap between surveys may actually exist. Soil survey orthophoto quad maps should be evaluated for exact boundaries.

No warranty made for data usage purposes not intended by the BLM.

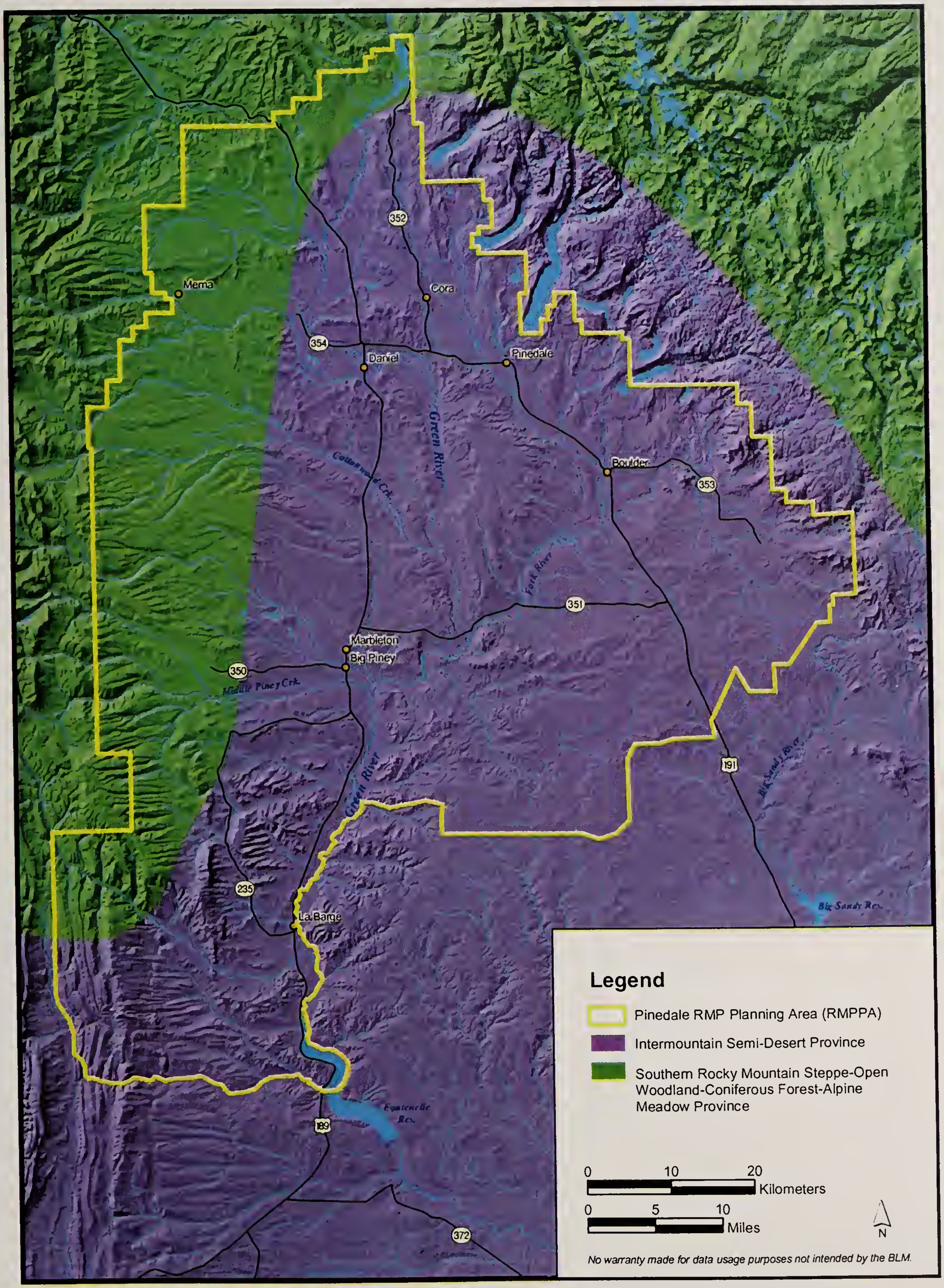
f:\5880-016\MSA_maps\soils\soils_map1.mxd (7-10-2002)

Figure 3.13-1. Order III Soil Survey Locations.


Town of Pinedale
Tyler Street
0 0.25 0.5 Miles
Base map taken from Pinedale NW and Mount Airy NE, WY digital orthophoto quarter quadrangle (1994).
352
Mera
Cora
354
Daniel
Pinedale
Green River
Boulder
353
Silver Mountain OHV Area
Paradise Road
East Green River Road
Access Not Allowed But Used
351
Access Issue Across Private Land
Marbleton
Big Piney
350
Burma Road
Red Dugway
Jonah Field
191
235
La Barge
La Barge Creek Road Acquisition of Easements
Miller Mountain Land Exchange
189
372
Legend
Pinedale RMP Plannning Area (RMPPA)
Road
Transportation Impact
OHV Concern
Access Issue
Transportation Impact
OHV Concern
Access Issue
0 10 20 Kilometers
0 5 10 Miles
N
No warranty made for data usage purposes not intended by the BLM.

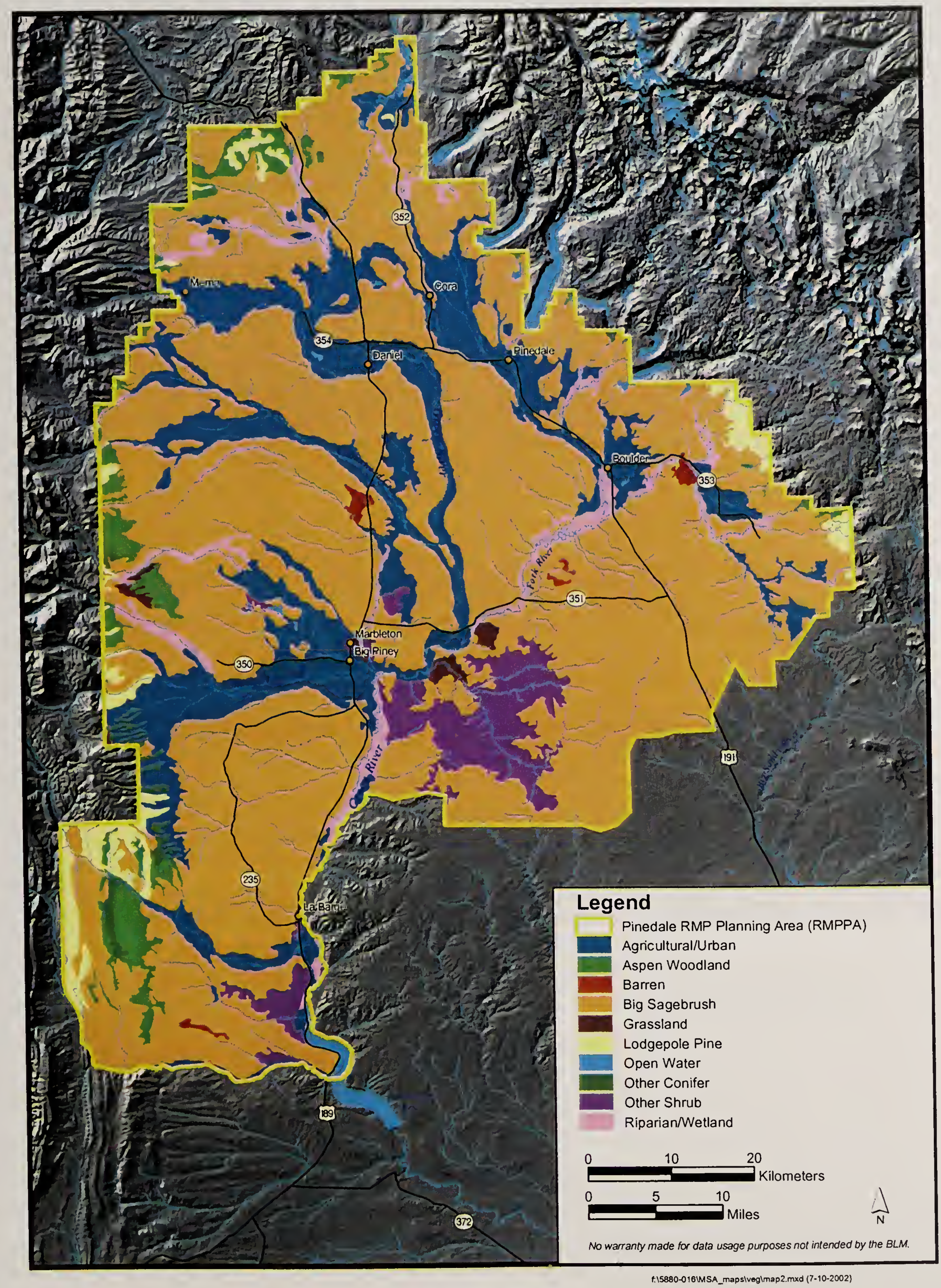
f:\5880-016\MSA_maps\trans_map1.mxd (7-10-2002)

Figure 3.14-1. Transportation and Access Issues.


Mema
352
Cora
354
Daniel
Pinedale
Green River
Cottonwood Crk.
Boulder
353
Fork River
351
Marbleton
Big Piney
350
Middle Piney Crk.
Green River
191
Big Sandy River
235
La Barge
Big Sandy Res.
Fontenelle Res.
189
372
Legend
Pinedale RMP Planning Area (RMPPA)
Intermountain Semi-Desert Province
Southern Rocky Mountain Steppe-Open Woodland-Coniferous Forest-Alpine Meadow Province
0
10
20
Kilometers
0
5
10
Miles
N
No warranty made for data usage purposes not intended by the BLM.

f:\5880-016\MSA_maps\veg\map1.mxd (7-10-2002)

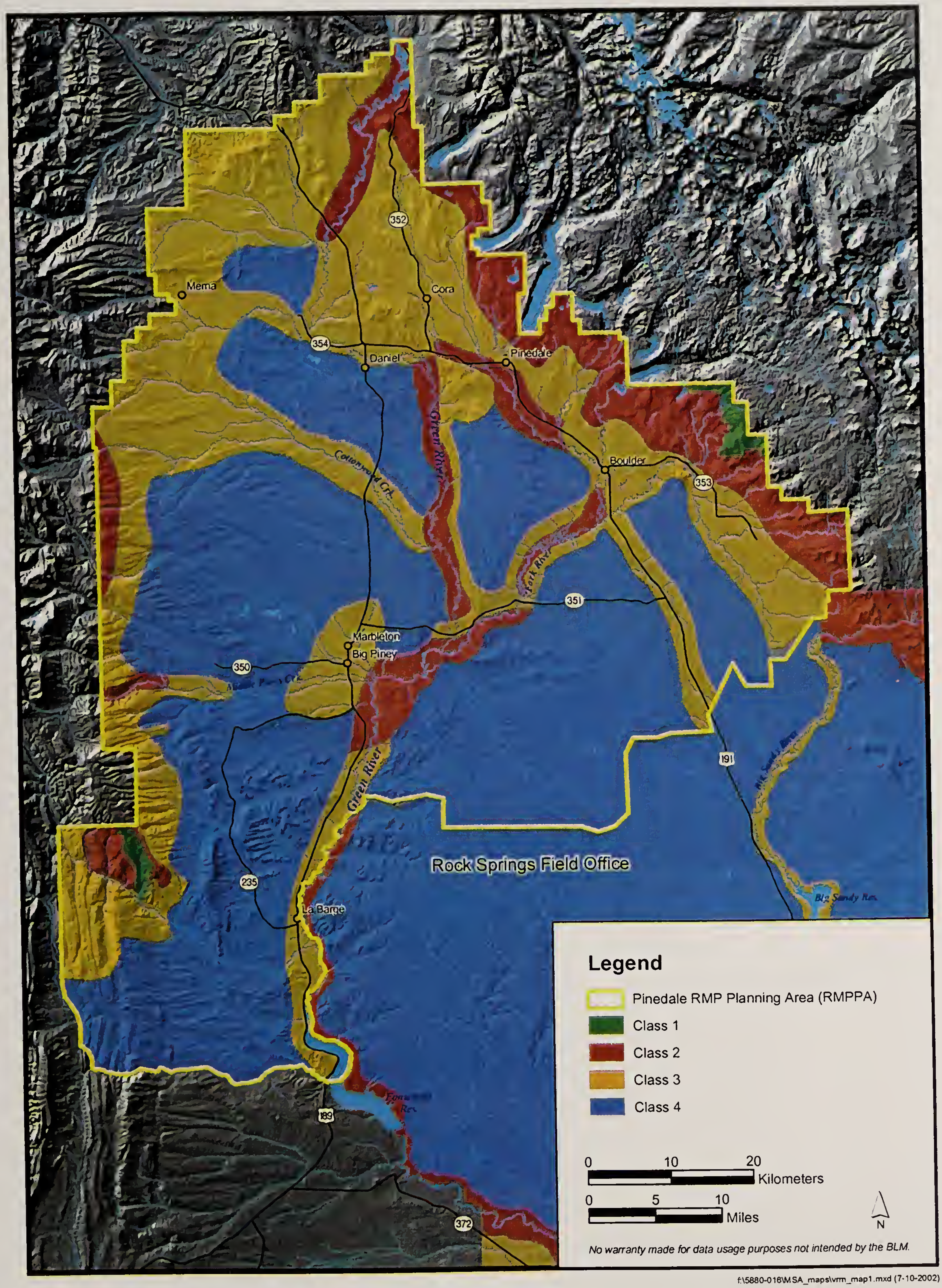
Figure 3.15-1. Ecoregion Provinces (Bailey 1995).


352
Cora
354
Daniel
Pinedale
Boulder
353
351
Marbleton
Big Piney
350
191
235
La Barge
189
372
Legend
Pinedale RMP Planning Area (RMPPA)
Agricultural/Urban
Aspen Woodland
Barren
Big Sagebrush
Grassland
Lodgepole Pine
Open Water
Other Conifer
Other Shrub
Riparian/Wetland
0
10
20
Kilometers
0
5
10
Miles
N

No warranty made for data usage purposes not intended by the BLM.

f:\5880-016\MSA_maps\veg\map2.mxd (7-10-2002)

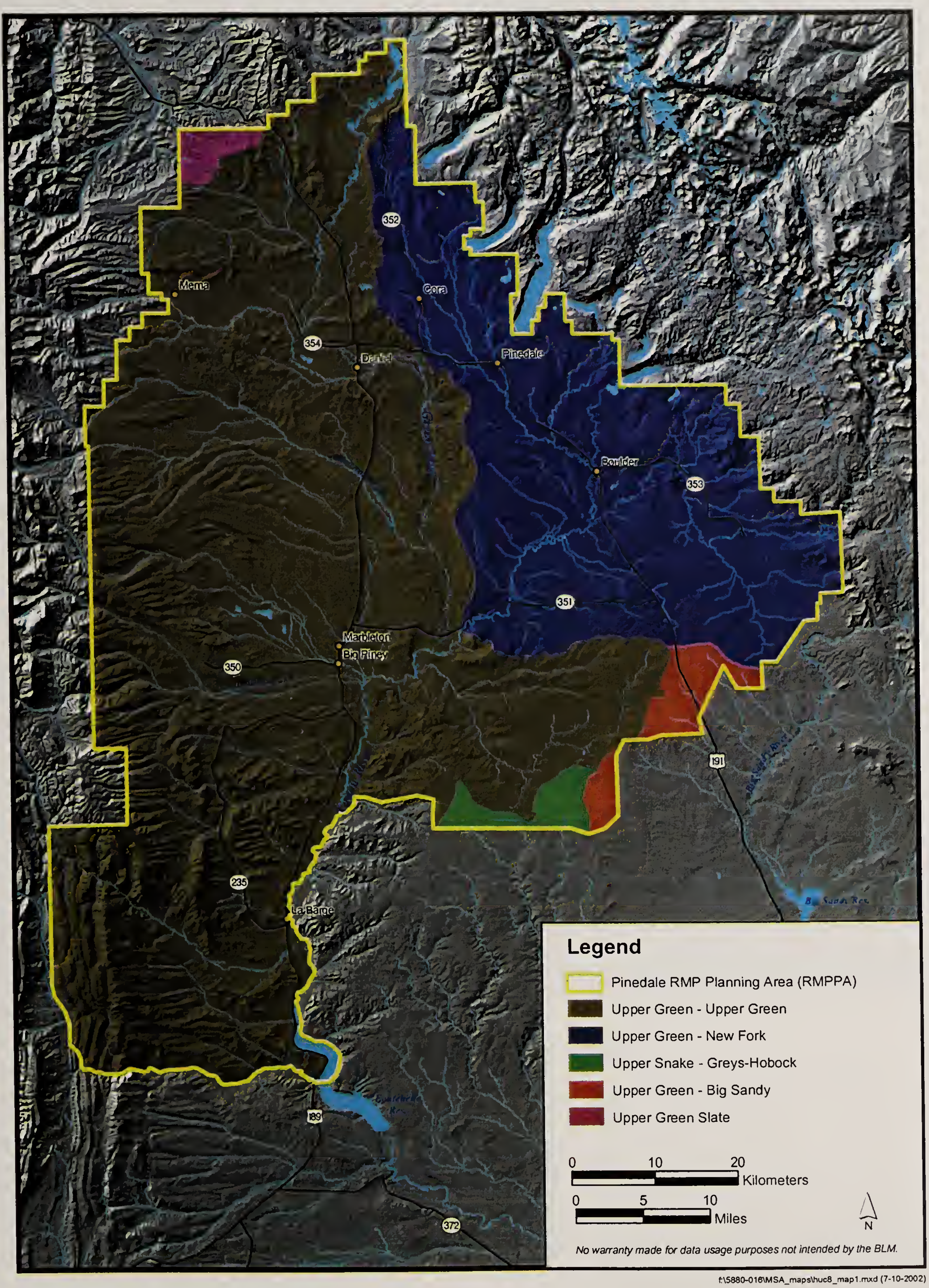
Figure 3.15-2. Vegetation Communities.


Mema
352
Cora
354
Daniel
Pinedale
Green River
Cottonwood Crk.
Boulder
353
New Fork River
351
Marbleton
Big Piney
350
North Piney Crk.
Green River
191
Big Sandy River
Rock Springs Field Office
235
La Barge
Big Sandy Res.
Fontenelle Res.
189
372
Legend
Pinedale RMP Planning Area (RMPPA)
Class 1
Class 2
Class 3
Class 4
0
10
20
Kilometers
0
5
10
Miles
N

No warranty made for data usage purposes not intended by the BLM.

f:\5880-016\MSA_maps\vrm_map1.mxd (7-10-2002)

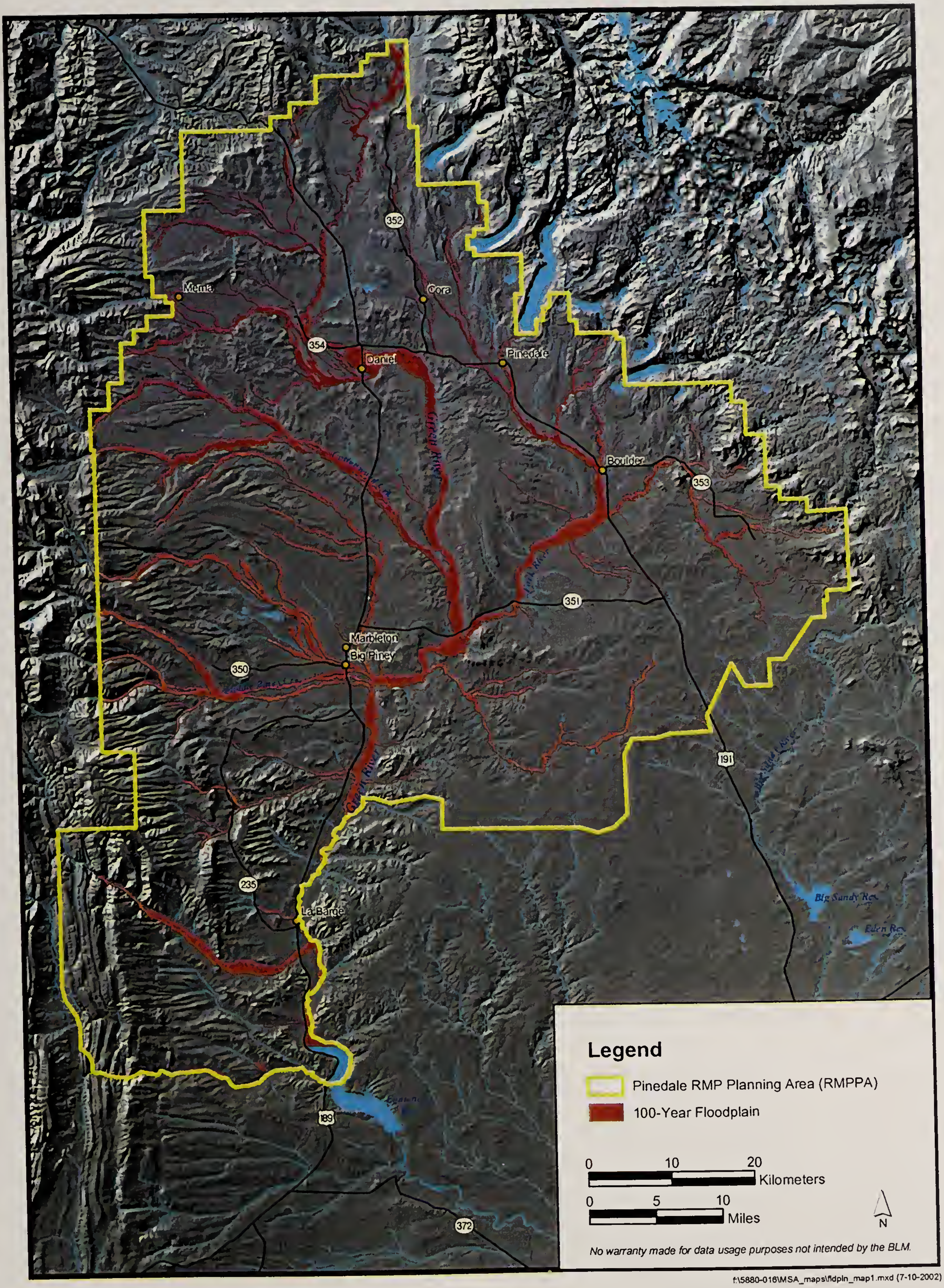
Figure 3.16-1. Visual Resource Management Classes.


352
Cora
Merna
354
Daniel
Pinedale
Boulder
353
351
Marbleton
Big Piney
350
191
235
La Barge
189
372
Legend
Pinedale RMP Planning Area (RMPPA)
Upper Green - Upper Green
Upper Green - New Fork
Upper Snake - Greys-Hobock
Upper Green - Big Sandy
Upper Green Slate
0
10
20
Kilometers
0
5
10
Miles
N

No warranty made for data usage purposes not intended by the BLM.

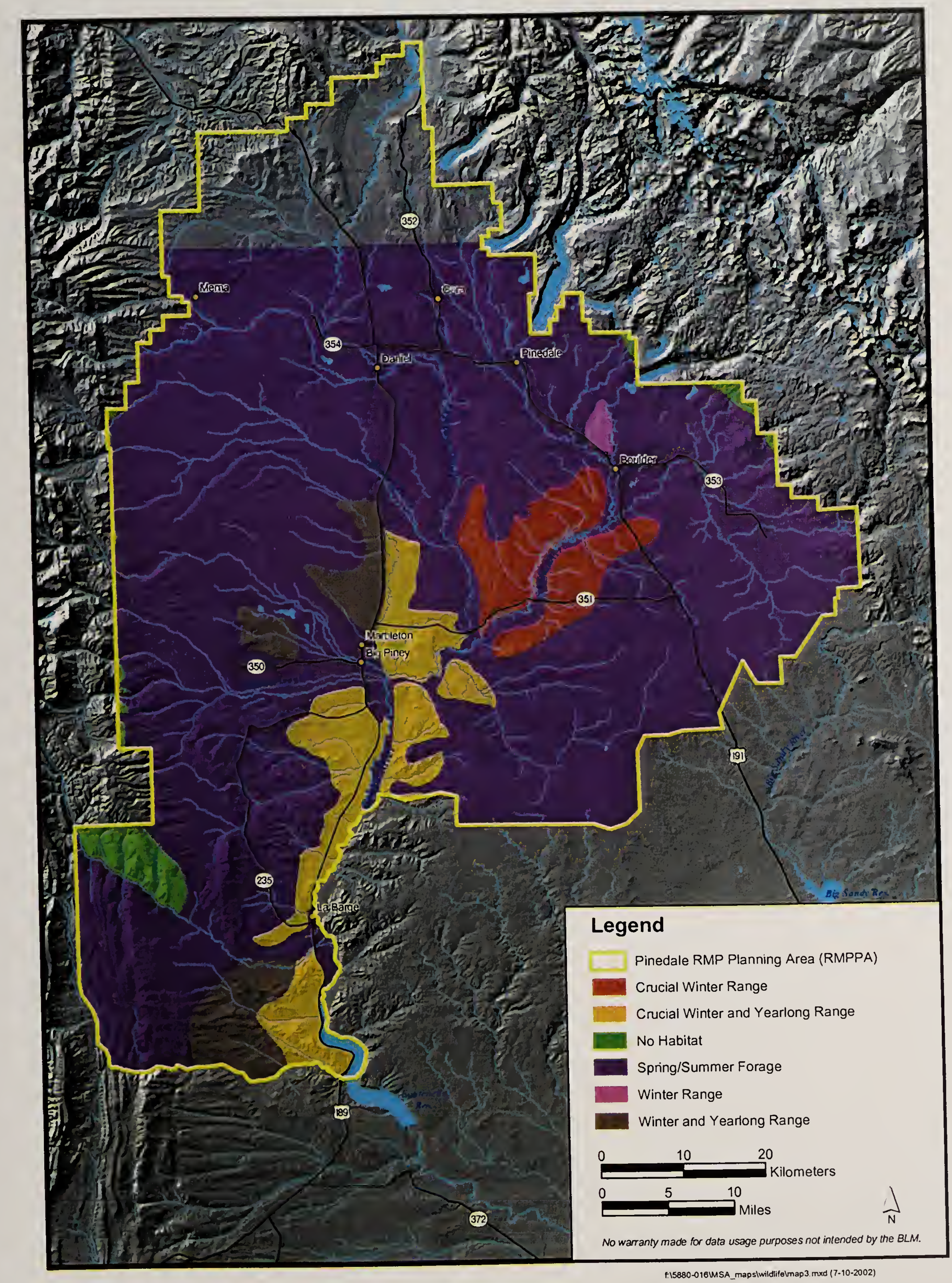
f:\5880-016\MSA_maps\huc8_map1.mxd (7-10-2002)

Figure 3.17-1. Watershed Boundaries.


352
Mema
Cora
354
Daniel
Pinedale
Boulder
353
351
Marbleton
Big Piney
350
191
235
La Barge
Big Sandy Res.
Eden Res.
189
372
Legend
Pinedale RMP Planning Area (RMPPA)
100-Year Floodplain
0
10
20
Kilometers
0
5
10
Miles
N
No warranty made for data usage purposes not intended by the BLM.

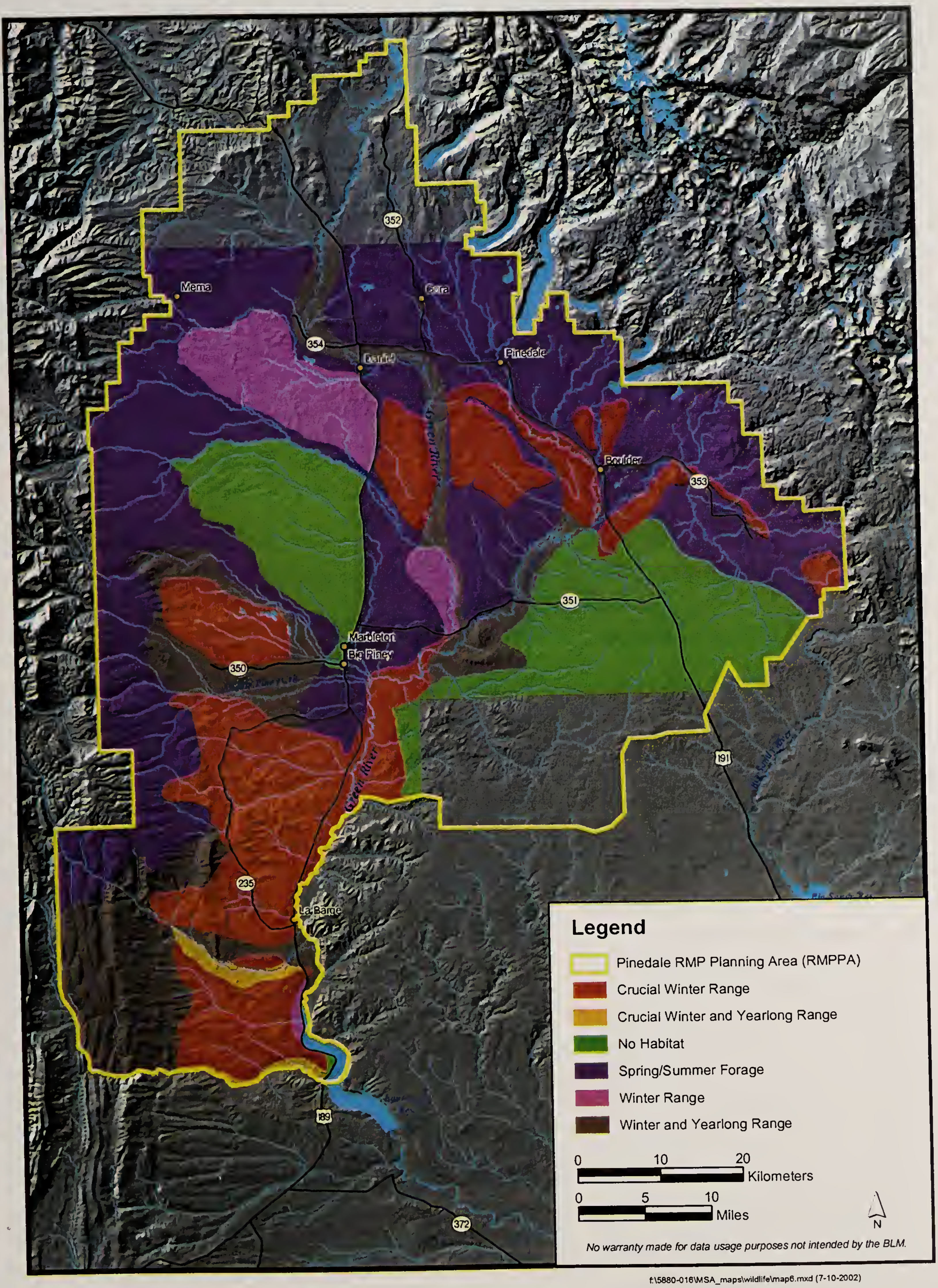
f:\5880-016\MSA_maps\fldpln_map1.mxd (7-10-2002)

Figure 3.17-2. 100-yr Floodplain.


Mema
Cora
352
354
Daniel
Pinedale
Boulder
353
351
Marbleton
Big Piney
350
191
235
La Barge
189
372
Big Sandy Res.
Legend
Pinedale RMP Planning Area (RMPPA)
Crucial Winter Range
Crucial Winter and Yearlong Range
No Habitat
Spring/Summer Forage
Winter Range
Winter and Yearlong Range
0 10 20 Kilometers
0 5 10 Miles
N
No warranty made for data usage purposes not intended by the BLM.

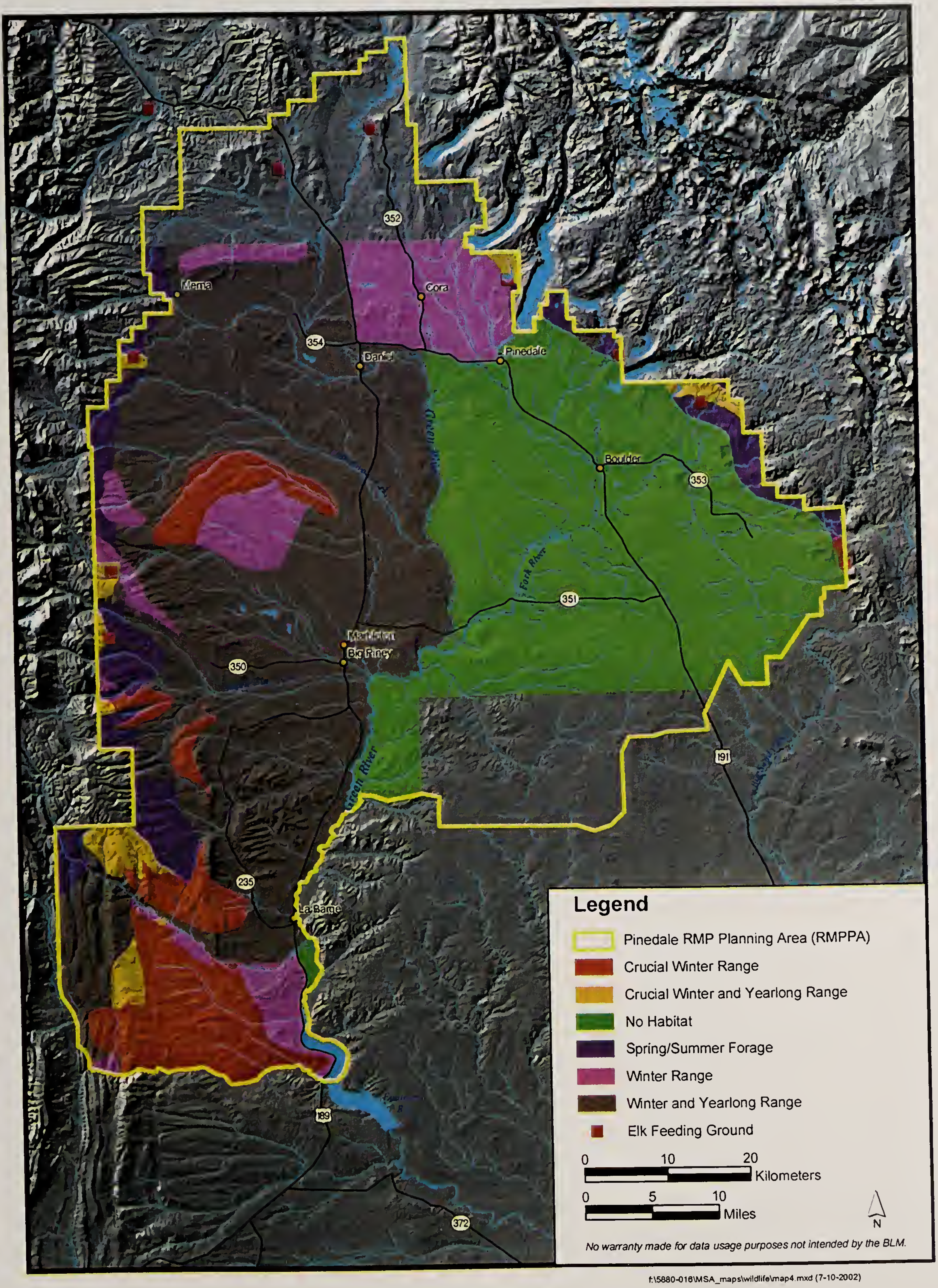
f:\5880-016\MSA_maps\wildlife\map3.mxd (7-10-2002)

Figure 3.19-1. Seasonal Distribution of Pronghorn Antelope Populations.


Mema
Cora
352
354
Daniel
Pinedale
Green River
Boulder
353
351
Marbleton
Big Piney
350
191
Green River
235
La Barge
189
372
Legend
Pinedale RMP Planning Area (RMPPA)
Crucial Winter Range
Crucial Winter and Yearlong Range
No Habitat
Spring/Summer Forage
Winter Range
Winter and Yearlong Range
0
10
20
Kilometers
0
5
10
Miles
N
No warranty made for data usage purposes not intended by the BLM.

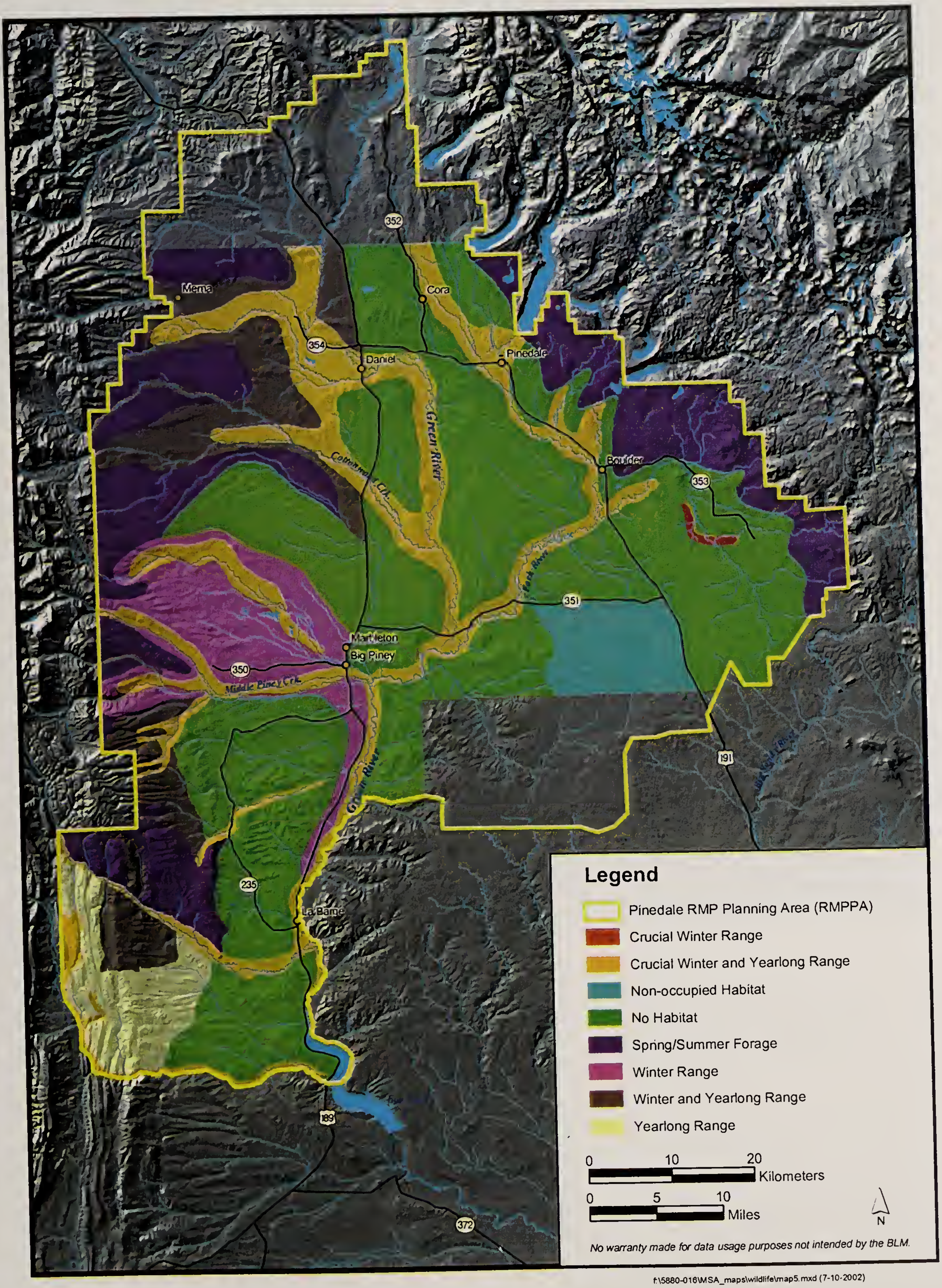
f:\5880-016\MSA_maps\wildlife\map6.mxd (7-10-2002)

Figure 3.19-2. Seasonal Distribution of Mule Deer Populations.


Merna
Cora
352
354
Daniel
Pinedale
Green River
Boulder
353
New Fork River
351
Marbleton
Big Piney
350
Green River
191
235
La Barge
189
372
Legend
Pinedale RMP Planning Area (RMPPA)
Crucial Winter Range
Crucial Winter and Yearlong Range
No Habitat
Spring/Summer Forage
Winter Range
Winter and Yearlong Range
Elk Feeding Ground
0 10 20 Kilometers
0 5 10 Miles
N
No warranty made for data usage purposes not intended by the BLM.

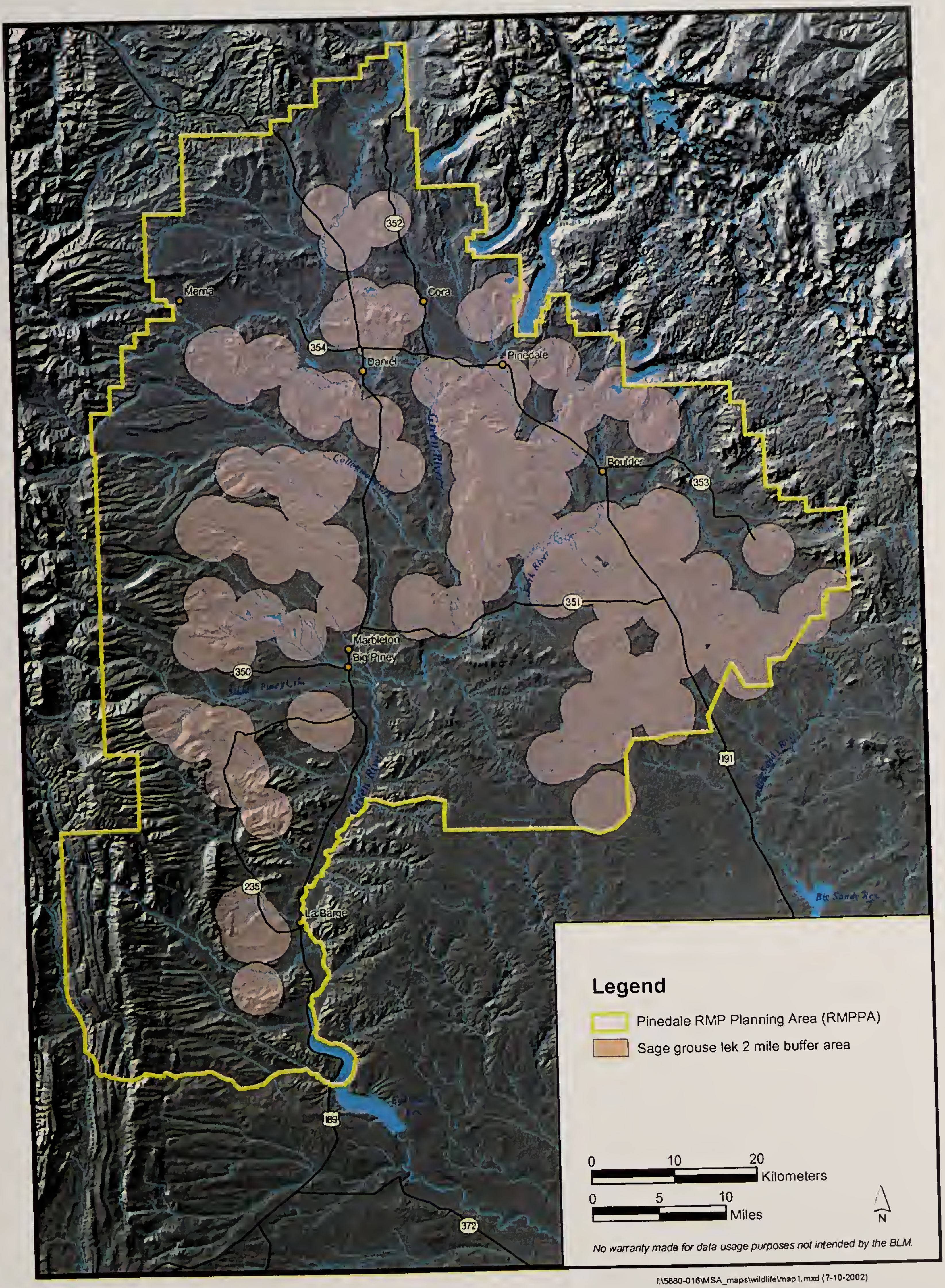
f:\5880-016\MSA_maps\wildlife\map4.mxd (7-10-2002)

Figure 3.19-3. Elk Feeding Grounds & Seasonal Distribution of Elk Populations.


Mema
Cora
352
354
Daniel
Pinedale
Green River
Cottonwood Crk.
Boulder
353
351
Marbleton
Big Piney
350
Middle Piney Crk.
Green River
191
235
La Barge
189
372
Legend
Pinedale RMP Planning Area (RMPPA)
Crucial Winter Range
Crucial Winter and Yearlong Range
Non-occupied Habitat
No Habitat
Spring/Summer Forage
Winter Range
Winter and Yearlong Range
Yearlong Range
0 10 20 Kilometers
0 5 10 Miles
N
No warranty made for data usage purposes not intended by the BLM.

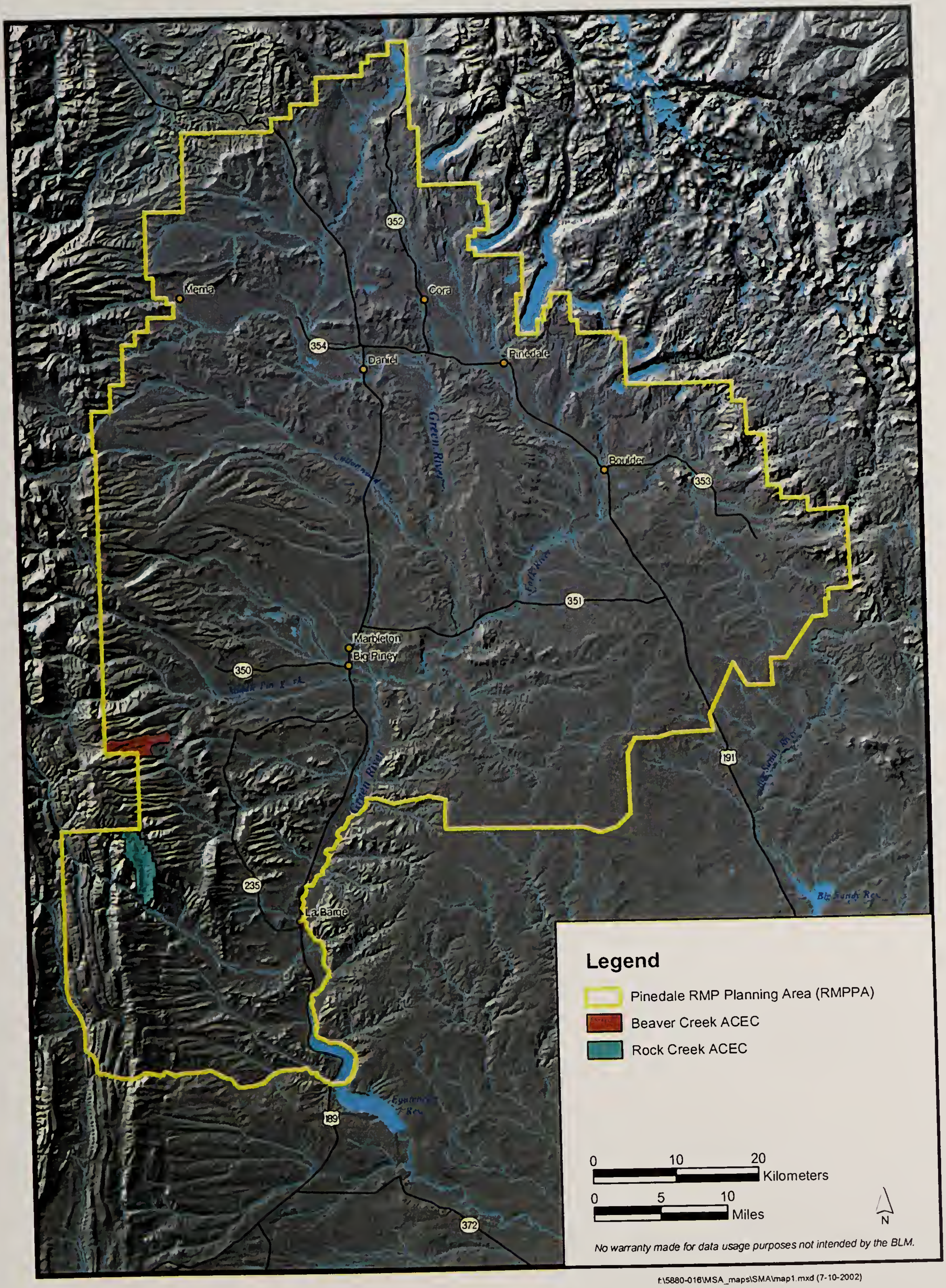
f:\5880-016\MSA_maps\wildlife\map5.mxd (7-10-2002)

Figure 3.19-4. Seasonal Distribution of Moose Populations.


352
Merna
Cora
354
Daniel
Pinedale
Green River
Boulder
353
351
Marbleton
Big Piney
350
191
235
La Barge
189
372
Big Sandy Res.
Legend
Pinedale RMP Planning Area (RMPPA)
Sage grouse lek 2 mile buffer area
0
10
20
Kilometers
0
5
10
Miles
N
No warranty made for data usage purposes not intended by the BLM.

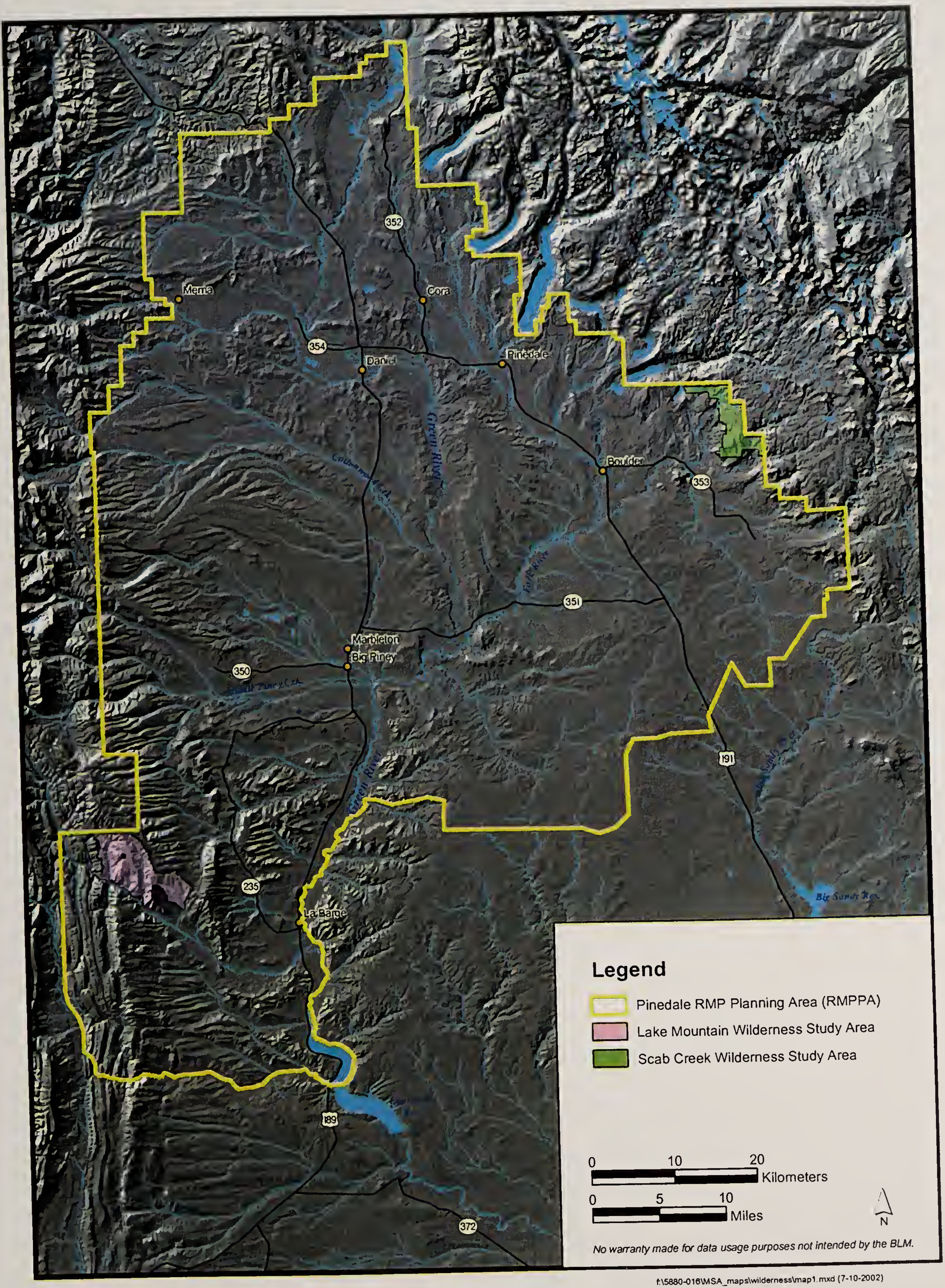
f:\5880-016\MSA_maps\wildlife\map1.mxd (7-10-2002)

Figure 3.19-5. Sage Grouse Leks and Management Buffer Areas.


Merna
Cora
352
354
Daniel
Pinedale
Green River
Boulder
353
351
Marbleton
Big Piney
350
191
Green River
235
La Barge
Big Sandy Res.
189
372
Legend
Pinedale RMP Planning Area (RMPPA)
Beaver Creek ACEC
Rock Creek ACEC
0
10
20
Kilometers
0
5
10
Miles
N
No warranty made for data usage purposes not intended by the BLM.

f:\5880-016\MSA_maps\SMA\map1.mxd (7-10-2002)

Figure 3.20-1. Areas of Critical Environmental Concern.


352
Merna
Cora
354
Daniel
Pinedale
Green River
Cottonwood Creek
Boulder
353
351
Marbleton
Big Piney
350
South Piney Creek
191
Green River
235
La Barge
189
372
Big Sandy Res.
Legend
Pinedale RMP Planning Area (RMPPA)
Lake Mountain Wilderness Study Area
Scab Creek Wilderness Study Area
0
10
20
Kilometers
0
5
10
Miles
N
No warranty made for data usage purposes not intended by the BLM.

f:\5880-016\MSA_maps\wilderness\map1.mxd (7-10-2002)

Figure 3.20-2. Wilderness Study Areas.

4.0. IMPACTS ASSOCIATED WITH CONTINUATION OF EXISTING MANAGEMENT DIRECTION

This chapter presents a summary of potential impacts associated with continuation of existing management direction. This analysis should be considered preliminary in nature. The formal impact analysis process associated with an EIS process is best completed after all alternatives have been identified; therefore, impact analysis can occur on a parallel basis for all alternatives under consideration. Furthermore, at this early stage of the RMP/EIS process, extensive interdisciplinary discussion of potential impacts has not occurred. The next steps of the RMP/EIS process that will allow for extensive interdisciplinary discussion of impacts include public comment on the MSA and alternatives development, to occur in late 2002 and early 2003.

4.1. AIR RESOURCES

(THIS SECTION IS BEING COMPLETED BY SUSAN CAPLAN FROM THE BLM STATE OFFICE)

4.2. CULTURAL RESOURCES

The Existing Management Direction is intended to identify and protect significant cultural resources within the RMPPA from surface disturbing activities related to multiple uses of BLM-administered lands. The various uses of BLM-administered public lands are managed to avoid damage to cultural resources; minimize conflicts between uses of cultural resources and other uses of the public lands; provide for appropriate mitigation of unavoidable adverse effects on cultural resources prior to their disturbance or destruction; and identify and protect cultural resources.

Under the Existing Management Direction, the BLM meets its goals and objectives concerning significant cultural resources in compliance with the various legislation and mandates under which it operates. The goals of this framework include:

- giving full consideration to cultural resources in all land use and management decisions
- minimizing conflicts between uses of cultural resources and other uses of public lands

- providing for appropriate mitigation of adverse effects on cultural resources prior to their disturbance or destruction.

Avoidance of inadvertent damage to or destruction of cultural resources located on BLM-administered lands has proven more elusive, due to the complexity of the buried archaeological record encased with San Arcacio soils and the rapid development of the gas field along Sand Draw. Numerous unanticipated discoveries attest to this situation.

Preparation of activity plans on any current or future sites listed on, or determined eligible for, the National Register of Historic Places (NRHP) will provide greater protection of significant sites by implementing the site-specific management prescriptions included in activity plans. Significant sites include: sites 48LN300, 48SU350, and 48SU301, the Overlook Rock Shelter, the Aspen Stone Circle site, the Cora Butte alignment site, the Willow Lake site, and the Boulder Lake site.

The Cultural Heritage Strategic Plan for the Pinedale RMPPA proposes taking the following cultural resource protective actions:

- identification and evaluation of the Rock Springs New Fork Wagon Road
- improvement of Lander Trail management
- development of an on-going artifact curation program
- preparation of a bio-archaeological assessment of Ruby Butte
- preparation of public education processes
- stabilization of the Wardell Buffalo Trap site
- protection of the Holden Hill Site
- preservation of prehistoric rock art inscriptions
- protection from artifact pilfering in the Jonah and Pinedale Anticline Fields
- conduct of annual meetings with key Native American Tribes
- pursuit of stronger working relationships with the public
- implementation of the Boulder Lake Cultural Resource Management Plan
- nomination of significant cultural resource sites to the National Register of Historic Places as they are identified and evaluated.

The Pinedale Field Office intends to take land actions (e.g., exchanges) in support of cultural resource management objectives, as appropriate, and to the extent staff and budgetary resources are available. Also, compliance with the cultural resource management decisions and other requirements is being monitored on the performance of: 1)cultural resource use permittees, and 2)BLM lease stipulations and other use authorizations on selected sensitive sites. The Pinedale Anticline ROD contains a new clearance process within Appendix E, *The Wyoming Protocol for Implementing National Programmatic Agreement for Cultural Resources Management,* which facilitates working with Operators to streamline cultural resource clearances and evaluations. This process is expected to improve the Pinedale Field Office's ability to assess and resolve the over 800 cultural resources projects handled by the Pinedale Field Office annually. West Wyoming Community College in Rock Springs is curator for materials removed from BLM cultural resources sites. The College is in the process of creating an on-line cultural resources website to enhance public awareness and education about recent discoveries and sites.

If the extent of unanticipated discoveries during construction monitoring continues at the present pace, a resulting increase in demands for clearances and delays to fluid minerals development projects should be anticipated. This is particularly so where significant cultural resources sites require excavation and evaluation prior to development, consistent with Application for Permit to Drill (APD) stipulations.

To provide a more timely response for such situations, several measures could be implemented. These include developing a cultural resource context for the RMPPA that would define what constitutes a significant site, and developing different, novel protocols to identify significant, subsurface archaeological sites prior to construction. A Programmatic Agreement may be needed to manage discovery situations if the Jonah Field is developed more intensely.

In addition, Pinedale Field Office cultural resource staff time is limited due to the increasingly heavy workload on project-by-project compliance efforts. Time to prepare and implement cultural resource plans may not be available unless additional budget and staff resources are made available to the Pinedale Field Office in concert with the increased fluid minerals development activity. Without additional resources, extended delays in development of fluid mineral resources can be expected when cultural resources are encountered so that they can be evaluated and mitigated.

BLM is also moving toward closer interaction with other groups having an interest in cultural resources. Due to enhanced tribal interest in recent cultural resource activity, the Pinedale Field Office anticipates being more proactive in Native American consultation than it has been in the past. Also, BLM is seeking a stronger working relationship with museum societies, including the Oregon California Trails Association.

Trail management is developing more of a landscape perspective. For example, the Pinedale Anticline ROD establishes a no-development zone of 3 miles on either side of National Trails within the RMPPA in areas affected by project ROWs. BLM requested and has obtained appropriations for FY2002 to assess the condition of two segments of the Oregon Trail within the Pinedale RMPPA. Date from this cultural resource inventory of the Trail segments and assessment of associated landscape condition will be used to develop a management plan, which will mandate that the Trail Segments not be improved and that their visual landscape be protected at no less than VRM Class II. More national trail work is foreseen over the next 20 years, which will involve closer coordination with affected local communities and state agencies. In addition, more archeological digs are expected to follow from inventories being currently conducted. Finally, a Lander Trail Back Country By-way is being discussed, and more interpretive signage along major stretches of the by-way will be considered to guide and educate tourists about the Trail's history and landscape significance.

4.3. FIRE

Wildfires are an unavoidable occurrence within the RMPPA, and will continue to occur both naturally and through human interaction with the natural environment. Implementation of the National Fire Plan requirements and associated funding for fuels reduction activities will provide for planning and implementing an increased number of prescribed burns for fuel reduction, particularly within BLM forest management units. A Fire Management Action Plan conforming to the National Fire Plan will be developed and implemented for the RMPPA. Specific boundaries (Figure 4.3-1) and fire management prescriptions will be consistent with or in support of the other identified resource values and management objectives (Appendix G). The implementation of the National Fire Plan on BLM-administered lands within the RMPPA will result in an overall reduction in the number of wildfires and number of acres burned over the 20-year planning period.

Fire protection on public lands is managed by taking suppression actions appropriate to the terrain, resource management considerations, and the need to protect health, safety, and property. Resource and operational support for presuppression and suppression planning will continue to be closely coordinated with the Forest Service, Sublette County Sheriff's Office, Wyoming State Forestry Division, and local fire protection districts.

Wilderness areas will continue to be managed as prescribed fire areas. Fire suppression in wilderness areas requires restraint in suppression methods; therefore, in cases where the conditions are appropriate for non-suppression, wildfires will be allowed to burn as they would under natural conditions, to the extent that life, safety of individuals, and property are protected.

Fire management activities associated with both wildfire and prescribed burns provide a variety of benefits and impacts for numerous resources. Examples of benefits would include reduced risk of wildfire to urban areas and to other high-risk fire zones and increased forage for livestock and wildlife. Examples of impacts would include damage to cultural or paleontological sites, destruction of or damage to vegetation or wildlife (including special status species), and loss of life and property. Adverse effects would arise through the fire itself or through application of fire retardants, fire line construction, vehicle operations, and smoke damage. Prolonged lack of prescribed burns or wildfires would reduce the grass/forb component of the system and increase brush occurrence.

Fires that are prescribed or that occur within prescribed fire areas are typically beneficial because they occur under environmental conditions or in areas where they can be contained and where they do not become excessively hot. Fires that occur outside prescribed fire areas, particularly under environmental conditions that support their rapid expansion, are most often detrimental. These often burn with such intensity that they kill the rootstocks of even the most fire-resistant species and often damage soil fertility, leaving it essentially barren for years. Depending on the severity of the burn, such sites may never return to the vegetation mix present at the time of the burn.

4.4. FOREST

The Forest Management Plan from the 1988 RMP (BLM 1988) is based on a 20-year period. The forest plan is mainly based on management of what may be logged, although a balance of other resource values was beginning to be contrasted against timber value when the plan was drafted.

Factors that would continue to be considered in forest management within the RMPPA include potential forest product production, natural and recreational values, and enhancement of other resources such as wildlife habitat. Timber harvesting practices would continue to be consistent with accepted silvicultural guidelines for each species, but also reflective of individual stand or resource conditions, and of environmental concerns as outlined in the 1988 Pinedale RMP.

Timber harvests would continue to be a low priority on forest units and timber harvesting would be expected to be significantly lower than projected in the 1988 Pinedale RMP. Timber harvest work in riparian areas would be protected from surface disturbing activities and would be managed to protect designated elk winter range and elk feeding grounds. Clear cutting would be limited to less than 25 acres on all four forest units and no clearcutting or road construction would occur within 1,000 feet of Beaver Creek in the Deadline-Pinegrove Unit. All forest management activities would continue to be excluded within the Finnegan and North Piney elk feeding grounds, except where such activity would be necessary to maintain the integrity of the feeding ground environment. BLM would continue to maintain a minimum of 90 percent of the conifer acreage in the Deadline-Pinegrove and Miller Mountain Units and seasonal closures would continue to protect elk habitat. Forest product harvesting would continue to be prohibited in the Scab Creek Campground area, but campers would be allowed to obtain firewood.

Fuel reduction activities would increase in all four forest management areas as the *National Fire Plan* objectives are implemented. A fuel reduction plan for the Eastside-Hoback Unit is being developed to reduce fuels within the Unit. As a result, significant reduction in fire risk would occur.

4.5. GEOLOGY, TOPOGRAPHY, AND MINERALS

As discussed in Section 3.5 and in the *Pinedale Mineral Occurrence and Development Potential Report*, oil and gas drilling and coalbed methane development projects would continue to increase within the RMPPA with continuation of the Existing Management Direction into the future.

Most of the RMPPA has a high potential for the occurrence of hydrocarbons. Development of these resources would be allowed to continue under Existing Management Direction up to any specific limits enacted as part of the Records of Decision for drilling activity areas such as the Pinedale Anticline or Jonah Field. Activities expected to occur in the future to support hydrocarbon development include leasing of Federal lands, seismic surveys and other exploration methods to identify potential oil/gas locations, and development of the resources. Coalbed methane development is also expected to continue and increase, but its future level of development is more uncertain than that of oil and gas.

With respect to the continued energy resource development in the RMPPA, effects from oil and gas activity on other resources, and effects to oil and gas activity from other BLM programs can be identified. Potential impacts from oil and gas or coalbed methane activity include:

- disturbance of vegetation and soils
- air emissions
- displacement of wildlife habitat
- disturbance or destruction of cultural and/or paleontological resources
- health/safety concerns
- conflicts with recreation or livestock grazing
- degraded water resources
- degraded visual resources.

These impacts have already been identified with the existing level of development, and would likely occur at a higher magnitude in the future if the Existing Management Direction continues. Impacts from other programs on the oil and gas industry include seasonal restrictions on exploration and/or drilling activity, and limited surface occupancy requiring directional drilling. These types of effects on oil and gas companies ultimately lead to increased costs of production and the potential loss of production and revenue, while public users lose a potential energy resource.

The *Draft Pinedale Mineral Occurrence and Development Potential Report* projects an estimated total disturbance of 12,200 acres due to oil and gas development through 2020 (compared to an estimated disturbance of 5,737 acres through 2001) based on nearly 7,000 drilled wells through 2020 (compared to an estimated 3,722 wells drilled through 2001).

The Pinedale Field Office staff is developing protocols that will minimize the impacts on other resources as the increased demand to open BLM-administered lands to further fluid minerals exploration, leasing, and development is realized. The Pinedale Anticline ROD specifies that lands will be withheld from leasing until a new RMP has been completed. Additionally, the ROD identifies nine areas in which specific management decisions will protect natural and cultural resources as oil and gas development proceeds (Table 2.8-1). Well spacing for both the Pinedale Anticline and Jonah II project areas is 40 acres per well pad. The extensive oil and gas lease stipulations that protect cultural, wildlife and natural resources fall into four main categories:

- No Surface Occupancy (NSO) stipulations
- Timing stipulations (seasonal use)
- Control surface use stipulations
- Lease notice stipulations.

All leases contain Lease Notice No. 1 prohibiting development within 500 feet of riparian areas and 200 feet of highways and roads. No wells are allowed on the Bench Corral to protect the elk feeding grounds. However, interest in leasing this area is intensifying and industry pressure on the Bench Corral is expected to increase if this area demonstrates development potential. At this time BLM regards the Bench Corral area as essential to the management of elk herd and has no plans to open the area to leasing. Any change in the availability of the area for leasing would not occur without full environmental assessment, public notice and involvement and compliance with NEPA. Currently, no oil and gas leases in the planning area are under suspension at this time for violations of oil and gas stipulations.

The RMPPA has five coal methane wells operating at this time. Interest in coalbed methane development is intensifying and is becoming more economically viable. In addition to the surface disturbance impacts typical of oil and gas development (e.g. roads, well pads, etc.), coalbed methane development requires disposal of substantial amounts of groundwater as part of the extraction process. Re-injection of this water into the appropriate aquifer depths having water quality lower than that being re-injected is required by stipulation. This action eliminates surface impacts that could result from surface disposal and protects the natural water quality of existing aquifers. In addition to the potential for coalbed methane development, other mining activity would likely be limited to aggregates (e.g., sand and gravel) and decorative stone (moss rock and boulders). With low per-unit valuations, the aggregates and decorative stone market is highly localized.

Overall, oil and gas development will likely continue to be the major focus of activity within the RMPPA with continuation of the Existing Management Direction. This activity will continue to cause conflicts with other natural resources and resource programs within the RMPPA.

4.6. HEALTH/SAFETY AND HAZARDOUS MATERIALS

The primary health and safety concerns within the Pinedale RMPPA are associated with hazardous materials. Other health and safety issues are associated with fire, ranching and recreation. Potential impacts from health and safety issues range from simple cuts and abrasions to loss of life as a result of personal injury and from transitory burning of mucous membranes and skin rashes to systemic and long term responses such as cancer as a result of exposure to hazardous waste.

Other than maintenance on selected stretches of road and stipulations on where OHVs may travel, BLM management does little to control personal injury to ranchers and recreationists using BLM-managed lands. However, existing national legislation (e.g., RCRA and CERCLA) requires that hazardous waste spills and/or dumping be removed and remediated by the responsible party to prevent endangering human health and/or further environmental damage. Thus, BLM's role is in requiring that proposals for exploration and operation of minerals adequately address proper handling of and exposure to hazardous materials. Natural resource development activities such as oil and gas resource drilling, coal mining, and coalbed methane development would continue to be the most likely sources of hazardous materials that could be spilled or dumped. As development activities increase and as more people use the public lands, the possibility of chemical spills and unauthorized dumping would increase.

The oil and gas industry has developed standard operating procedures and regulatory compliance methods that reduce the potential for environmental or human harm from hazardous materials exposure. These procedures are being regularly monitored and re-evaluated to determine their effectiveness. As development activities increase and as more people use the public lands, the possibility of chemical spills and even unauthorized dumping increases. However, the potential for a spill, other accident, or illegal dumping can be minimized but not entirely cannot be eliminated through management measures.

Prior to disposal of any BLM-administered lands or acquisition of any private lands, an environmental condition assessment (Phase 1 study) would be required in order to protect the public from contact with hazardous materials and to eliminate any liability to the Federal government. In addition, water resources would be tested to determine if hazardous substances were present.

4.7. LANDS AND REALTY

In the near future, lands and realty activities are expected to focus on small land disposal actions, land exchanges, and rights-of-way (ROWs) for roads and transmission lines to support approved oil and gas development activities. Oil- and gas-related ROW activities have increased commensurate with increased fuel minerals development and have reduced the availability of staff resources to process other land and realty actions Proposals to dispose of BLM-administered public lands would be considered, evaluated, and implemented on a case-by-case basis according to criteria developed by the Pinedale Field Office.

Very few private land parcels have been identified for acquisition by the Pinedale Field Office. The Pinedale Field Office is working to change the criteria for land acquisition and expects to move away from the traditional practice of listing parcels in the RMP identified as having management problems-- such as isolated remnant lands—for disposal. The new criteria will take into account the wildife, recreation or cultural resource values pertinent to these isolated lands, which may argue strongly for retention of certain parcels in order to protect these values. BLM has applied this approach on lands they administer at the Cora Y highway crossing north of Pinedale, on the south end of Fremont Lake, and on other important wildlife migration routes where retention would enable free movement of migrating big game animals.

Currently, two land exchanges are being conducted by the Pinedale Field Office: 1) the Miller Mountain exchange, which proposes to acquire isolated 40-acre parcels of private lands in exchange for BLM-managed land; and 2) the Johnson Ridge Exchange. Also, a statewide land exchange, commonly referred to as the Pittsburgh Midway exchange, is being processed by the BLM State Office. If approved, this exchange would convey 640 acres of Federal mineral estate in exchange for an acreage of equally valued BLM-administered lands identified for disposal in various Wyoming Field Offices. One such parcel identified for disposal is located in the Pinedale Field Office administrative area. These and other proposed land exchanges would not be approved unless the resource management and environmental benefits are clearly substantiated in the NEPA compliance process and the exchange meets the requirements of FLPMA and is consistent with the approved Pinedale RMP.

Withdrawal review of outdated secretarial withdrawals of public lands has been a low priority due to limited staffing. An intensive withdrawal review program was initiated by the BLM in the 1980s, but was halted by a lawsuit. Following completion of the lawsuit in the early

1990s, withdrawal review became a lower national priority and the funds to complete the process were reduced. Therefore, without a change in this policy, impacts from withdrawal review activities can expected to be minimal over the next 20 years.

The Pinedale Field Office proposed lifting the Secretarial withdrawals for coal, oil shale, and phosphate to implement a management decision made in the 1988 RMP. However, these withdrawals were never acted upon. The revocation of these withdrawals is still an objective of the Pinedale Field Office and future attempts will be made to resolve these outstanding issues.

The corridor designations in the existing Pinedale RMP have been modified from their original designated routes. The Corridor Study published by the Western Utility Group (1994) shows current and proposed corridors. Due to the existing and on-going development of the Jonah Field, Pinedale Anticline Field, and Myrna Field, new corridors for the transportation of oil and gas will be identified and designated, after the completion of this NEPA review process. The criteria established by the Wyoming Bureau of Land Management's Standard Mitigation Guidelines for Surface Disturbing Activities will be strictly followed. Rights-of-way acquisition for pipeline corridor development will be coordinated with the Rock Springs Field Office.

The concept of a western transportation corridor has been developed by the Pinedale Field Office as a management tool to prevent rights-of-way encroachment across the Green River. Where possible, pipeline and utility corridors would follow existing road surface and utility rights-of-way. Limits on the number of pipelines, roads, and utility lines and their consolidation in existing and proposed rights of way corridors, to the extent practicable, would prevent the proliferation of rights-of-way routing across public lands, reduce the impact of these developmental activities on BLM-administered lands and resources, and minimize the impact on wildlife resources and habitat over the next 20 years.

The existing RMP does not address communication sites. Currently, Hogsback and Mt. Airy, both of which are in big game winter range habitat, are being used for communication towers.

The Mt. Airy site is at capacity and would need to expand further into big game winter range habitat, or a new communication site would need to be located. Hogsback is quickly filling to capacity, particularly with the use of guy wires to support the towers. As a result, a new location for communication sites will be identified in the near future.

4.8. LIVESTOCK GRAZING

BLM Allotment Management Plans (AMPs) and designations of critical habitat, calving and feeding areas for wildlife resources are coordinated with ranch operators to minimize the impacts of grazing activities on wildlife resources. Wildlife/livestock forage competition is more prevalent between elk and livestock. Elk and livestock are both grazers, so there is more dietary overlap. In addition, many of the allotments are in critical elk winter range. In order to reduce potential conflicts, oil and gas wells are not developed in critical elk winter range. Elk and cattle benefit from vegetation manipulations that increase grasses and forbs.

Deer and antelope are considered browsers; their preferred forage is brush species such as sagebrush, mountain mahogany, and bitter brush. These plants are not typically grazed by cattle or horses. This results in minimal dietary overlap and few conflicts. Sheep do eat brush species, but the sheep allotment is not in mule deer winter range. Vegetation manipulation that reduces shrub species would impact these browsers.

An important population of Colorado cutthroat trout inhabits the Rock Creek drainage of the Upper North LaBarge Allotment. Cattle grazing in the riparian area has been eliminated for one mile of this stream. An enclosure has been constructed to improve the riparian habitat by reducing trampling and grazing pressures from cattle. The grazing in this allotment is being managed in accordance to the ACEC plan.

The current grazing preference objective of approximately 105,000 animal unit months (AUMs) would be maintained or increased through implementation of AMPs, range improvements, and vegetation manipulation. If these measures failed to provide the grazing preference objective while providing for protection of other resource values as established in the plan, livestock reductions might become necessary. Any adjustments in livestock grazing use would be made as a result of monitoring and in consultation with grazing permittees and other affected interests.

Improved range conditions would result in areas subject to vegetation manipulation project implementation. Approximately 98,552 acres have been identified as suitable for vegetation manipulation to increase forage production in the I and M allotments. Brush control guidelines (Table 2.18-3) would be applied to acreages determined suitable for vegetation manipulation (Appendix M). Vegetation manipulation also reduces the risk of range fires in affected areas.

Large-scale gas field development in the Jonah Field and Pinedale Anticline has the potential for livestock grazing conflicts and impacts to the forage resource. These include construction activities, open trenches, large areas of soil disturbance, increased vehicle traffic, and shifts in grazing distribution. Monitoring has not been conducted to determine the extent of impacts or conflicts, if any. BLM-administered lands have been impacted due to oil, gas, and coal methane activities. In areas where heavy truck traffic from fluid mineral development is prevalent, livestock tend to concentrate in the less active areas. Occasionally trucks damage cattle guards and fences, resulting in a mixing of cattle and unauthorized uses. Increased monitoring and surveillance of heavy truck activity is necessary, resulting in the need for more staff resources to assure adherence to APD stipulations and requirements to protect ranch improvements.

For upland range monitoring (BLM 1988), key plant species are identified for each allotment. Selection of key species is tied directly to management objectives for the allotment. Key species are generally important components of a plant community and serve as indicators of change. A key species may or may not be a forage plant. Problem species such as poisonous plants or species valuable for reducing erosion, which are not the most valuable forage species in the area, could be selected as key species. More than one key species may be selected for an allotment depending on management objectives and data needs. Cover transects, photo points, and grazing exclosures are also methods that are used. Category I allotments are preferentially given the highest frequency or intensity of monitoring to assess their status.

The Proper Functioning Condition (PFC) assessment is based on quantitative science for riparian areas and provides a starting point for determining and prioritizing the type and location of quantitative inventory or necessary monitoring. The BLM's objective is to improve riparian conditions, and have at least 75 percent of the riparian communities in PFC. BLM's objective is to have all streams at risk to be brought up to standard within 10 years.

Under the Existing Management Direction, existing water sources would likely continue to be insufficient to allow uniform distribution of cattle within allotments. Some areas near water sources on some allotments are being over-utilized, while other areas are being underutilized. BLM range conservationists are working with operators to identify ways to provide more uniform grazing of these allotments to reduce the impacts of grazing near water sources.

4.9. OFF-HIGHWAY VEHICLE RESOURCES

As a result of increased OHV use, some of the OHV management actions proposed in the 1988 Pinedale RMP are being reconsidered. The Desert General Use Area, designated as "open" to OHV use, is being reconsidered for designation as a "limited" OHV use area. OHV use within this area is causing disturbances to wildlife and vegetation, and unmanaged OHV trail creation is increasing the rate of soil erosion.

The BM has clear authority to control OHV use on public lands under a number of statutes, regulations and executive orders, including the following.

- Executive Order 11644 (President Nixon, 1972) provides that ORVs shall be permitted only where the BLM maps the routes and determines that impacts to resources and conflicts with other visitors are "minimized."
- Executive Order 11989 (President Carter, 1977) provides that federal land managers shall close land to OHVs where the machines cause "considerable adverse effects."
- regulations codified at 43 C.F.R. ' 8340 et seq. implement the executive orders and provide that areas and routes for OHV use shall be designated in RMPs to minimize conflicts and impacts

- FLPMA at 43 U.S.C. 1782(c) requires the BLM to manage WSAs so that their suitability as wilderness is not impaired and, at 43 U.S.C. ' 1732(b), so that BLM lands are not unduly or unnecessarily degraded.

BLM is considering some OHV "open" areas, in some cases as "sacrifice areas," for the specific purpose of containing or concentrating OHV use. This change would better protect the resources within the RMPPA and make it easier to manage and monitor OHV use. The areas for such intensive OHV management have not yet been identified.

Based upon the present OHV use trends, potential impacts from OHV activity under the Existing Management Direction would include:

- long-term, negative effects of extensive soil erosion, loss of vegetation, degradation of wildlife habitat, and wildlife disturbance in areas of heavy, unmanaged OHV use. Also, continued expansion of OHV trails would have related long-term negative effects on visual quality
- long-term reduction in water quality from oil or fuel spills at stream crossings, and from sedimentation of streams and creeks with eroded soils
- long-term increasing risk of fire from human activity such as campfires and smoking that may be associated with the use of OHV trails. Internal combustion engines also increase the risk, particularly if proper spark arresters are not in place
- the long-term, negative effects on air quality (and visual quality) caused by the increased production of fugitive dust that could cause a localized reduction in visibility.

Direct, short-term, adverse effects from OHV-produced noise near recreational opportunity areas where noise would be considered intrusive would continue to occur. OHV-produced noise would tend to degrade and diminish the recreational quality for those users who seek solitude, quiet, and natural settings for camping, hiking and related recreational activities not involving OHV use.

4.10. PALEONTOLOGY

Current guidelines focus on the management of paleontological resources exposed at the ground's surface through the issuance of paleontological collection permits and elimination of public access to sensitive areas. However, the rapid increase of oil and gas exploration in the Pinedale RMPPA is creating direct paleontological resource impacts through the destruction of sensitive fossils during ground-disturbing activities. Current management guidelines are not adequate to assure mitigation and/or prevent loss of significant paleontological resources in areas where oil and gas exploration and development are occurring.

Currently, an operator-committed resource protection plan has been developed to mitigate impacts; however, the plan does not require paleontological resource monitoring by independent, qualified paleontologists during surface disturbance. The current policy relies solely upon the oil and gas operator to report paleontological resource finds while excavating (*BLM Procedural Manual--Application for Permit to Drill [APD] Procedure).* This policy could result in potentially serious, direct negative impacts on sensitive paleontological resources contained in the Pinedale RMPPA if oil and gas operators are not diligent in their efforts to identify and report paleontological discoveries. The Pinedale Field Office staff is seeking to provide greater protection of the paleontological resources in the path of fluid minerals development through more intensive and restrictive monitoring and reporting requirements, and requests for additional staffing budgets to support monitoring requirements. If these BLM activities are not successful in the near future, the potential loss of unquantifiable paleontological resources can be expected due to failure of operators to report and assess discoveries resulting from surface disturbance related to exploration and drilling activities.

4.11. RECREATION

Under the Existing Management Direction, recreation management emphasis would continue to be placed on designated recreation management areas including Scab Creek, the Green and New Fork Rivers, Oregon Trail routes, and Boulder Lake. Recreation management for the above referred areas would emphasize maintaining or improving the quality of the sites and the recreation experience.

Public lands along the Green and New Fork Rivers would be managed to provide fishing and float boating opportunities. Additional recreational facilities would continue to be developed as funding becomes available to accommodate increased recreational use and to protect resources in recreational areas. Boulder Lake would be established as a Special Recreation

Management Area (SRMA) and related recreation facilities would be developed to improve public access and use opportunities.

A maximum 14-day camping limit is enforced throughout the planning area. As necessary, areas requiring shorter limits are posted, and written authorizations are required for longer periods. A temporary, no overnight camping stipulation may be imposed in an emergency.

Recreational use in the planning area would continue to grow as a result of increased tourism activity and population in Sublette County and the intermountain west. The direct, long-term impacts to recreational resources, under the 1988 Pinedale RMP may include the following:

- the potential loss of some dispersed recreational opportunities as a result of displacement, oil and gas development, urban encroachment, and private development adjacent to BLM-administered lands. A resulting reduction would occur in the ability of recreational users to experience solitude, isolation, and a natural landscape in areas where oil and gas and other development activities are occurring or expected to occur in the future
- long-term, increased levels of noise, dust, traffic, visually intrusive facilities, potentially intrusive night lighting, and new roads associated with oil and gas development are expected to conflict with recreational activities in fluid mineral project areas
- potential increase in recreational pressures at established recreational areas and campsites is anticipated as urban growth and tourism continue. Also, seasonal overcrowding at camping areas, within SRMAs, and areas along the Upper Green River would require more intensive management to maintain a high quality recreational experience. Resource use conflicts are increasing as a result of overcrowding, and it is expected that the instances and degree of such conflicts would continue to increase. Changes in the recreational experience might include loss of solitude, increased noise, intrusive night lighting, dissatisfaction with the recreational opportunities, and permanent changes in the recreational natural setting and landscape caused by overuse.

The indirect effects of increases in the level of recreational development activities within the Pinedale RMPPA may result in some changes in recreational use patterns and the levels of visitation resulting from increased overcrowding in campsites and recreational areas, and the loss of some areas to recreational use as a result of fluid mineral development activities.

4.12. SOCIOECONOMICS

The BLM does not manage socioeconomic resources. Rather, it manages public lands and the natural resources that occur on them, working cooperatively with other Federal and with State agencies to manage those natural resources where multiple agencies have a mandate to protect and manage the resources (e.g., fossils, artifacts, fish, and wildlife). Nonetheless, as can be seen in numerous sections of this MSA (e.g., Sections 4.5, 4.8, 4.9, 4.11, 4.14, 4.15, 4.16, 4.19, 4.20), socioeconomic resources are integrally connected with BLM's management of public lands.

Some areas within or near the RMPPA would continue to experience increased population growth, particularly in the Pinedale area. Any increases in population would tend to be influenced by continued growth of the oil and gas development industry, and by increasing demand for the area's high quality scenic and recreational resources. The current shortage and high cost of housing in the Pinedale area could limit population increases in the near future unless additional housing is made available.

Based on trends already underway (see Section 3.12), income in the socioeconomic study area would continue to see an increasing proportion from non-earned income sources, such as pensions, interest, and dividends. Substantial increases in earned income would accrue from oil and gas operations, which have relatively high wage levels compared to the service and retail economic sectors.

For those areas with increasing populations, experience in other areas indicates that indirect effects would occur to housing and public services. The housing supply is a private sector function, with little or no involvement of governments except to review and approve development plans and necessary zoning requirements. It is assumed that public services necessary to support additional housing in Pinedale would be approved prior to the construction of new housing or developments, as necessary, to accommodate the added demand. Therefore, an increasing demand for public services is expected to affect service-provider (e.g., cities, counties, and special districts) budgets, unless developers are required to bear the additional cost. Additional revenues would be generated at all levels of government (including school districts) from increased oil and gas development activities through resulting payment of ad valorem taxes, severance taxes, Federal royalties, and other taxes on facilities and production.

More specific information on potential economic benefits and costs will be provided in the NEPA documentation to be developed later in the RMP process.

4.13 SOILS

Following the Existing Management Direction would maintain the soil resource in its present condition in some areas. Salinity, sodicity, and other limiting soil characteristics need to be identified throughout the RMPPA to prevent erosion in areas where highly erodable soils occur. Soils in the northern and eastern parts of the area have not yet been mapped, and there are presently no management plans to complete this work.

4.14 TRANSPORTATION AND ACCESS

Under the Existing Management Direction, a detailed evaluation and prioritization of high-density roaded areas in the RMPPA would be completed to determine needs for specific road closures and/or rehabilitation. Priority evaluation areas include the Red Canyon, Red Castle Creek, and Fish Creek areas, as well as oil and gas fields in the southwestern portion of the resource area. Some existing roads may be closed except for administrative purposes. Specific mitigation measures and design requirements for roads would be developed through environmental analyses as part of specific project or activity planning. Proliferation of roads would be managed. Access closure, abandonment, and acquisition would be considered and established through activity planning and environmental analysis processes. Road or trail closure and abandonment would be based on desired road or trail densities; demands for new roads; closure methods (e.g., abandonment and rehabilitation, closures by signing, temporary or seasonal closures); type of access needed; resource development or protection needs; and existing uses.

The most substantive transportation policy relevant to the RMPPA originated from traffic impact studies (TISs) completed for new oil and gas development. Each development proposal for the oil and gas industry is accompanied by a TIS to assess the potential impact to the transportation system from implementation of the proposed action. The BLM requires oil and gas operations to use specific designated roadways to access operations as specified in the APDs. The BLM has determined that some use of non-authorized roadways in violation of APDs is creating additional impacts to the infrastructure, increased noise and dust, and, in some cases, posing a threat to the recreating public by adding large trucks to the rural roads.

Since the 1988 RMP was published, two major developments have required a TIS: the Pinedale Anticline project (BLM 2000) and the Jonah Field II project (BLM 1997).

The Jonah Field EIS identified impacts to Highway 191, Wyoming Highway 351, Luman Road, and Burma Road. The TIS outlines the following measures for traffic management:

- generate annual transportation plans
- use existing roads to the maximum extent possible, rather than establishing new roads
- complete reclamation/revegetation of roads not required for routine operation, as directed by the BLM or other managing agency
- obtain BLM's approval of submitted site-specific design and centerline surveys prior to road construction
- ensure operators comply with all exiting Federal, state, and county requirements and restrictions to protect road networks from the traveling public
- make special arrangements with the Wyoming Department of Transportation (WYDOT) for the transportation of special loads
- restrict all development activities along rights-of-way (ROWs) to specified areas
- strip soil prior to construction, then redistribute and re-seed it.

The EIS prepared for the Pinedale Anticline identified the need for a Memorandum of Understanding (MOU) between the counties, cities, and the managing entity for oil and gas exploration operations.

One objective of the current RMP is to "provide suitable public access to BLM-administered public lands" with access pursued, as needed, through the purchase of ROWs, easements, land exchanges, or reciprocal ROWs. The 1988 RMP also specifies the need to complete a detailed inventory of heavily-roaded areas to determine needs for specific road closures. Since this effort has not yet been completed, detailed information about the level of impacts and the potential for additional future impacts is not known.

Access priorities identified in the current RMP include:

- Red Canyon
- Red Castle Creek
- Fish Creek
- Oil and gas operations in the southwestern area of the Pinedale RMPPA.

More evaluation of road and trail closures will be required in the future. Road or trail closures should be based on desired road/trail densities, demands for new roads, closure methods, type of access needed, resource development or protection needs, and existing uses.

In the summer months, trucks serving the oil and gas industry use both Mesa Road and Tyler Street in Pinedale to access oil and gas operations. During the winter months, from January through April, Mesa Road is closed for deer winter range. During this time period, Tyler Street experiences twice the normal amount of traffic from oil and gas development vehicles, which brings more trucks through an established residential area (Wadsworth, 2002). Residents have also stated that truck traffic creates noise and congestion on Main Street and can be disruptive to businesses (Garnett 2002).

Traffic from oil and gas development vehicles results in additional impact to roadways leading to and from oil and gas operations (Wadsworth 2002). Increased monitoring of these activities is needed to enforce APD stipulations regarding timing and frequency of truck traffic to various facility locations.

Some roadways are built by oil and gas companies and then abandoned once exploration is complete. Currently, there is no standardized method for reclamation for these roads. Without a system for proper reclamation and closure, these roads present a liability and hazard after oil and gas operations cease.

4.15. VEGETATION

Typically, BLM manages resources under its commitment to a multiple-use policy. In the Pinedale RMPPA, vegetation resource demand is primarily being balanced between gas field development; cattle, game, and sensitive species range and habitat maintenance; and various recreation values. Thus far, the balance between surface disturbance (field development) and surface maintenance (range/habitat) activities on vegetated lands has been maintained. As mineral development in the RMPPA continues, however, maintaining this balance will become increasingly difficult.

Impacts to vegetation from minerals development are very difficult for BLM to control. At the time of leasing, BLM can add stipulations to the lease that are protective of vegetation. Stipulations cannot be added to old leases, however, unless there is documented evidence of their need. Except in limited No Surface Occupancy (NSO) areas, BLM cannot stop development (Sierra Club vs. Peterson (717 F. 2d 1409, 1983)—developers have the right to exploit their mineral leases to the extent that it is not permitable for the NEPA process to fully impede that right). The absence of adequate survey data on special status plant and animal species with only a 'sensitive' status rather than a form of 'threatened' status is not a basis for hindering projects from proceeding. In consequence, impacts to sensitive species and sensitive species habit may occur because they are insufficiently known.

Other impacts to vegetation are from management actions such as brush control. Big game and sage grouse habitat guidelines for brush control state that a maximum of 20 percent of sagebrush type vegetation may be treated at any time within winter, winter/yearlong, or summer habitat for antelope, moose, and mule deer (BLM 1988). Within crucial winter ranges for antelope, mule deer, and sage grouse, habitat guidelines for brush control are more stringent, specifying "no treatment unless beneficial to antelope, mule deer and sage grouse" (BLM 1988). Similar limitations are required on forested lands to prevent adverse affects to elk habitat by encouraging habitat regeneration and reduction of cumulative impact potential.

Other consequences that may continue to exist under the Existing Management Direction reflect the following observations:

- monitoring indicates that some existing livestock preference exceeds the current production of the vegetation communities involved
- portions of the one or more riparian areas are in unsatisfactory condition
- certain areas have excessive sagebrush canopy and/or decadent non-productive, old-age stands of sagebrush or greasewood, which reduces vegetation diversity and the amount of desirable forage available for wildlife and/or livestock. Other areas contain large amounts

of unproductive, closed stands of pinyon/juniper, reducing vegetation diversity, ground cover, and the amount of desirable forage available for wildlife and livestock
- excessive soil erosion is occurring in some areas because of a lack of vegetation cover, periodic off-highway vehicle use within the allotments is resulting in accelerated erosion on areas with fragile soils and well pads and roads from oil and gas development are accelerating erosion.

4.16. VISUAL RESOURCES

As described in Section 3.16, VRM classes have been established in line with overall resource management objectives of the 1988 Pinedale RMP. Under the Existing Management Direction, VRMs in WSAs would be managed as VRM Class I in accordance with BLM policy outlined in Instructional Memorandum No. 2000-096). This action would provide greater protection for visual landscapes in wilderness study areas.

The most likely sources of potential future impacts on visual resources result primarily from OHV use and the rapid increase of oil and natural gas exploration and extraction in the Pinedale RMPPA.

Visual impacts result from OHV use that cuts new trails and roads, and accelerates soil erosion. Areas of conflict between VRM class objectives and OHV use were described in Section 3.16. Under the 1988 RMP, OHV-produced visual degradation caused by the production of fugitive dust within the area has been categorized as localized, but short-term. Visual degradation from trail creation categorized as extensive and long-term.

Even with the strong adherence to guidelines, standards and APD stipulations, oil and gas development would affect the visual quality of large areas within the RMPPA to a degree dependant upon the density of well pads and the extent to which roads to pads are properly sited and dust control measures are followed. Direct, local adverse effects would result from:
- fugitive dust from road and well pad construction, and vehicle traffic associated with development
- the large number of proposed drilling sites and their associated drilling towers and support facilities, further altering the form, line, color and texture of the landscape

- increased night lighting of these wells and facilities that may introduce new, intrusive, and potentially undesirable elements into the visual landscape, affecting recreational opportunities and the recreational experience.

The wells, roads, and support facilities introduce new visual elements into the landscape and alter the form, line, color, and texture of the existing landscape. Indirect, regional effects of oil and gas development may include the increased degradation of air quality and the formation of regional haze (with associated loss of visual quality) from compressor engine emissions, vehicle emissions, and natural gases escaping from the oil and gas wells.

BLM's Standards for Healthy Public Rangelands and Guidelines for Livestock Grazing Management for Public Lands Administered by the Bureau of Land Management in the State of Wyoming (Appendix D), the Guidelines for Surface Disturbing Activities, and the specific buffer and mitigation actions required of fluid mineral operators developed in the Pinedale Anticline ROD and the Jonah II ROD constitute a substantial body of decisions aimed at reducing the impact of development on the visual landscape. For the most part, these requirements are contained in APDs currently governing oil, gas, and coal methane development. Monitoring these activities to assure compliance is difficult with the limited staff resources available to the Pinedale Field Office. Monitoring is key to assuring that the visual character of the landscape is not impacted beyond what is allowed by the guidelines and stipulations. BLM intends to request additional resources to assure full monitoring coverage.

The long-term impact trends for visual resources under continued management direction are:

- continued degradation of visual quality throughout the area from uncontrolled use of OHVs
- increasing visual resource use conflicts between recreational users who seek a high level of visual quality (i.e., campers, hikers, river rafters and floaters, those traveling through the area, fishermen, hunters, etc.) and oil and gas development
- continued reduction in visual quality in other areas of the Pinedale RMPPA as fluid mineral exploration and development continue to expand under existing leases; visual quality will likely be impaired from road construction, well pad construction, the erection of drilling towers, the placement and operation of well pumps, and the construction and operation of facilities needed to maintain these activities.

4.17. WATER QUALITY AND WATERSHED

Under the Existing Management Direction, management actions to control sediment and salinity buildup would continue to emphasize the reduction of soil erosion and contributions to the Green River Basin water system. Restrictions applied to surface-disturbing activities are found in Appendix C. Of particular importance would be those areas with highly saline soils, such as the Soap Holes Basin, and crucial watersheds where surface disturbance would be minimized. These crucial watersheds are generally found within the boundaries of the groundwater recharge zones (Figure 4.17-1). Specific management actions that are envisioned include:

- corrective measures to be applied where unsatisfactory watershed conditions are identified would be developed and implemented through activity plans (e.g., watershed, habitat, allotment, or timber management plans). Such measures would also be implemented through stipulations attached to permits, leases, and other authorizations.
- The Wyoming BLM Standard Mitigation Guidelines for Surface-Disturbing Activities (Appendix P) and the standard practices applied to surface-disturbing activities (Appendix C) are used to control nonpoint sources of water pollution in watersheds and reflect Best Management Practices (BMPs) relative to the Clean Water Act of 1972, as amended. As other BMPs for nonpoint sources of water pollution are developed, they would be incorporated into the guidance for this plan where they conform to the RMP objectives.
- A monitoring program for specific surface waters would continue to identify trends on water quality. Public drinking water at recreation sites would also be protected and monitored to comply with EPA safe-drinking water standards. A Level II ground water study of the Riley Ridge/LaBarge area has been completed to define the ground water resource and to determine what additional ground water monitoring and protective measures are necessary in regard to subsurface activities conducted in the area (e.g., oil and gas drilling activities).
- Ground water protection would continue to be assured by applying the procedures described in Appendix Q. Special precautions are taken to ensure protection of ground water quality when surface disturbance is contemplated on ground water recharge zones (Figure 4.17-1).
- An activity plan for reducing erosion and channel degradation would be prepared for the Tip Top watershed (Figure 4.17-1). Specific actions could include road maintenance, recontouring, and reseeding of disturbed sites to help achieve soil stabilization.
- A watershed/recreation plan would be prepared on the Stuart Point-Mount Airy area for reducing sedimentation while still allowing OHV use. (A more detailed description of management decisions for this area can be found in the Section 4.9).
- All actions would comply with Executive Orders 11988 Floodplain Management and 11990 Protection of Wetlands, the Clean Water Act, and the State of Wyoming Department of Environmental Quality water quality standards.

The environmental health of watersheds is monitored through analysis of the PFC of riparian vegetation and actions are taken accordingly. In general, BMPs are followed with respect to road building and other surface-disturbing activities associated with oil and gas leases; however, the overall road density resulting from oil and gas development activities, is currently contributing to higher sediment yield and likely will remain a major source of sediment yield into the future.

4.18. WILD HORSES

Wild horses have essentially been removed from the RMPPA in accordance with the current RMP, although a small wild horse group eluded capture in the 1990s and remains in the Desert Herd Management Area,. No future impacts from wild horses are expected.

4.19 WILDLIFE

A part of the Existing Management Direction, the current wildlife management strategy for the RMPPA was developed in concert with the 1987 Wyoming Game and Fish Department's (WGFD) wildlife management objectives. As practical, activity planning is to incorporate wildlife habitat protection and improvements. Under the Existing Management Direction, as WGFD management objectives are modified, or new objectives are presented, the BLM would review such changes and decide whether or not to incorporate them into the RMP.

During wildlife habitat activity planning, the BLM is to consider not only Federally listed threatened and endangered species, but other special status species such as those classified as proposed, candidate, sensitive, indicator, or any other relevant species category.

In 1998, an amendment was added to the 1988 RMP that incorporated the tenets of the Standards for Healthy Public Rangelands (43 CFR 4180.1) into all wildlife management actions. These fundamentals of rangeland health were developed to ensure that: (1) watersheds are functioning properly; (2) water, nutrients, and energy cycles are functioning properly; (3) water quality meets State standards; and (4) habitat for special status species is protected. Pertinent to wildlife habitats, the following specific components are to be considered:

- within the potential of existing conditions, soils will be stabilized by vegetation to allow for sufficient surface water permeability and minimal runoff
- riparian and wetland vegetation will have sufficient structural and species diversity as to allow for, and recover from, natural and human disturbances, and to function as forage and, as well as aid sediment retention and groundwater recharge
- upland vegetation will have sufficient structural and species diversity as to allow for, and recover from, natural and human disturbances, and to function as forage and cover, and support the efficiency of water and nutrient cycles
- rangelands will sustain viable populations of diverse native plant and wildlife species and habitats that support, or are capable of supporting, special status species will be maintained or enhanced
- in order to address water quality issues that originate on public lands, management actions or use authorizations will comply with all Federal and State water quality laws, rules, and regulations
- in order to address air quality issues that originate on public lands, management actions or use authorizations will comply with all Federal and State air quality laws, rules, and regulations.

The Wyoming BLM Standard Mitigation Measures for Surface-Disturbing Activities were developed to address the impacts of various land uses that directly modify surface features through the removal of vegetation or soil. Pertinent to wildlife management, and subject to modification and addendum as appropriate for specific or general actions, surface disturbances are restricted if any of the following conditions exist: (1) slopes in excess of 25 percent, except for timber harvest activities that may be conducted on slopes greater than 25 percent; (2) within 500 feet of a wetland, riparian, or surface water area, except for timber harvest activities that are restricted to a 100-foot buffer zone; and (3) construction with frozen material or during periods when the soil is saturated or when watershed damage is likely to occur, unless there is a high potential for rehabilitation or all impacts will be temporary in nature.

Protection measures implemented for specific species include:

- specific seasonal and daily restrictions that have been developed for sage grouse (*Centrocercus urophasianus*) lek and nesting sites. Surface-disturbing activities that are restricted include, but are not limited to: surface occupancy; the construction of roads, pipelines, utility corridors, or other types of rights-of-way; the installation of permanent or high profile structures such as buildings, storage tanks, and overhead transmission lines; the drilling of wells; and the construction of well pads. Restrictions are to be in effect from 1 March to 15 May for up to a two-mile radius of lek sites and from 1 April to 31 July for up to a two-mile radius of nest sites. Such restrictions may be modified or exempted if an acceptable plan to mitigate potential impacts can be developed. Some activities may be allowed if analyses indicate that local sage grouse concentrations will not be adversely affected

- restriction of activities within a one-mile-radius of active ferruginous hawk (*Buteo regalis*) nest sites between 1 February and 31 July. During the same period, such restrictions are in effect within a one-half-mile radius of active nest sites for golden eagle (*Aquila chrysaetos*), osprey (*Pandion haliaetus*), Swainson's hawk (*Buteo swainsoni*), Cooper's hawk (*Accipiter cooperii*), merlin (*Falco columbarius*), and burrowing owl (*Athene cunicularia*). Surface disturbing activities during the 1 February to 31 July nesting season for other raptor species are covered under the one-half-mile radius restrictions. Priority for raptor nest site surveys is given to areas where surface-disturbing activities have been proposed.

In 1990, the Wyoming BLM signed a Memorandum of Understanding (MOU) with WGFD. The purpose of this MOU was to facilitate cooperation between the two agencies in order to benefit special status species during wildlife management and activity planning on BLM lands. In August 2000, the BLM and the USFWS entered a Canada Lynx Conservation Agreement (CLCA) to promote the conservation of lynx and lynx habitat on Federal lands managed by the BLM. The CLCA will be in effect until 31 December 2004, at which time it will be renewed, amended, or terminated.

Fisheries management by the State of Wyoming in the waters of the Pinedale RMPPA is based on the WDGF Basin Management Plan concept. This concept identifies the major waters in each of the basins and sub-basins of the area and identifies management concepts, management objectives, limiting factors, present activities, and potential activities for each identified reservoir or river reach. Management in the RMPPA also considers potential impacts of various activities to Colorado River cutthroat trout populations. Additional management of the fisheries of the area consist of instream flow protection and minimum flow standards for specified stream and river reaches.

Oil and gas activities and livestock grazing continue to be primary threats to the fisheries in the area. Increased erosion resulting from these activities increases sediment loading and can lead to degradation of streams and spawning habitat for native and nonnative fish species.

4.20 SPECIAL MANAGEMENT AREAS

Under the Existing Management Direction, special management areas have been identified so as to recognize particular resources and enable the possibility of managing the area differently from other surrounding areas. The management actions for the special management areas that are currently identified (Rock Creek ACEC and Beaver Creek ACEC) are discussed below. Under the Existing Management Direction, the potential remains for identification of additional areas that have special resources that would benefit from designation.

The following methods to protect the Rock Creek and Beaver Creek ACECs are currently in place:

Rock Creek ACEC:

General Management Actions

- The entire ACEC and the Deadline-Graphite elk winter range area (approximately 17,100 combined acres) are deferred from mineral leasing until a mineral and wildlife evaluation is completed.
- The entire ACEC is managed as a right-of-way (ROW) avoidance or exclusion area, where ROWs are not allowed unless a supporting environmental analysis indicates the action meets the objective for the ACEC, minimal impacts would occur, and/or the action would be of benefit to the Colorado River cutthroat trout or elk habitat.

Management Actions for the Rock Creek Watershed (Drainage) Area of the ACEC :

- Constraints are applied to competing activities in accordance with the general management actions. A No Surface Occupancy (NSO) restriction for leasable minerals and other surface-disturbing activities is applied in the 4,200-acre Rock Creek drainage, unless activities are intended to be of benefit to the Colorado River cutthroat trout.
- Geophysical exploration activities in this area are restricted to portable methods only. The use of explosive charges is prohibited if analysis determines that unacceptable adverse resource impacts would result.

- If analysis indicates that prohibiting explosive charges is necessary, the drainage area will be closed to exploration and development of locatable minerals, and a withdrawal from mineral location and surface entry will be pursued.
- Livestock grazing and related improvements are allowed, provided no adverse affects to the Rock Creek drainage occurs.
- No forest management activities are allowed within the drainage.
- The drainage is managed as a Class I Visual Resource Management (VRM) area and will be closed to off-highway vehicle (OHV) use, including over-the-snow vehicles (43 CFR 8340.0-5). See the Visual Resources section for management criteria of Class I VRM.

Management Actions for the Remainder of the ACEC (Outside the Rock Creek Watershed):

- Approximately 1,000 acres of the ACEC (that portion outside the drainage) will be evaluated to identify any locations where surface occupancy can be allowed. Geophysical exploration activities in this area are to be evaluated on a case-by-case basis and are restricted if analysis determines that unacceptable adverse impacts would occur to the water quality, fisheries, wildlife, recreation, or visual values in the area.
- This portion of the ACEC is open to exploration and development of locatable minerals. A plan of operations is required for any locatable minerals activities in the area.
- This portion of the ACEC is managed as a Class II VRM area, and OHV use is limited to existing roads and trails with seasonal restrictions to protect wintering wildlife. See Section 4.16 for management criteria of Class II VRM.

Beaver Creek ACEC:

- The area is open for consideration of mineral leasing and related activities.
- All vehicle use, including geophysical exploration vehicles, is limited to existing roads and trails.
- The use of explosive charges within this area will be prohibited if analysis determines that unacceptable adverse impacts would occur to the water quality, fisheries, wildlife, recreation, or visual values in the area.
- The Beaver Creek ACEC will be managed to maintain, improve, or restore riparian habitat conditions.
- The ACEC will be managed as a Class III VRM area. See Section 4.16 for management criteria of Class III VRM.
- A detailed activity plan shall be prepared to establish guidelines for uses that could affect or jeopardize habitat quality for the Colorado River cutthroat trout and elk calving. Management prescriptions in the activity plan include identifying specific transportation routes to reduce the potential for spills of toxic materials, as well as specific needs for seasonal use or other types of restrictions, in compliance with the decisions stated above.

- Surface disturbance is prohibited within 1,000 feet of the streams and on slopes of 25 percent or greater.
- Partial timber cutting is allowed provided no adverse impacts occur to the Colorado River cutthroat trout habitat. Clear cutting or road construction within 1,000 feet of Beaver Creek is not allowed. Exceptions are granted only if additional site-specific analysis verifies that such actions do not adversely affect crucial Colorado River cutthroat trout habitat.
- Roads and rights-of-way are to follow existing alignments unless design criteria preclude adverse impacts to the cutthroat trout and elk calving habitats.
- Stream crossings are limited to lower elevations and gentler slopes.
- Use of equipment and vehicles, including geophysical exploration activities, are allowed if consistent with the objectives of the ACEC.

These measures would be continued under the Existing Management Direction.

Also under the Existing Management Direction, the existing Scab Creek and Lake Mountain WSAs would continue to be managed as WSAs until such time when Congress designates one or both of them as wilderness, or releases one or both of them from consideration as wilderness. Consequently, until such as determination is made, the wilderness values would be preserved for these two areas. There would be no additional wilderness proposed by the BLM, although there could be externally generated proposed wilderness proposal areas.

4.21 CUMULATIVE IMPACTS

Cumulative impacts result from several activities occurring at the same time, and in the same general location over a period of time. The result of this interaction is a synergistic impact where the sum of the effects from all contributing activities is greater than the simple addition of the whole. In the Pinedale RMPPA, some preliminary projections of cumulative impacts can be extrapolated from the management decisions and impact assessments in the MSA, taking into account the interactions of oil and gas development, livestock grazing, wildlife use and habitat protection, forest management, hunting and fishing, OHV use, recreational use, and other multiple uses on BLM-administered public lands and anticipated activity on intermingled private and state lands.

some cases, these sites may require special designation and more intensive management depending upon the level of visitor demand. Closer coordination and cooperation with Native American tribal interests will be necessary as the proliferation of new sites and archeological materials emerge

Inplementation of the National Fire Plan, and the resulting availability of funds for fire reduction planning and projects at the local level will result in an overall reduction in the risk of fire in treated fire prone areas and enhance response to fire incidents. An increase the number of fuel reduction projects and treated acreage in expected as well as enhanced cooperative strategies to protect the urban interface areas from wildfires. The existing fire suppression coorperative arrangements between BLM, USFS, Wyoming State Forestry Division, Sublette County Sheriff's Department, local cooperating fire agencies and the State Land Department will continue.

No significant long-term cumulative impacts from other land use activities in the RMPPA will result from the existing management scenario. As population growth, tourism and increased employment resulting from mineral development continues, additional recreational pressures are expected and additional facilities may be required to accommodate and managed the visitor population in the most intensely used areas. Timber harvest will continue at a low priority for the unforeseeable future.

The cumulative impacts of oil and gas development in the RMPPA will be significant over time. Resulting economic growth and increased real estate values in Pinedale and other affected communities can be expected to continue. These affects enhance a market already stimulated by a strong local second home, retirement and recreation market. Pinedale housing shortages, currently being experienced, will continue indefinitely requiring housing to be found in more remote locations. This situation should generate greater demands on local government for expansion of facilities, modifications in zoning and approval of development plans for housing and commercial projects, but also will provide an increased tax base to cover some of the costs of increased infrastructure and services.

BLM lands within major oil and gas and coal methane project areas will experience some environmental degradation, some loss of wildlife habitat and reduction in wildlife activity due to increased human activity, automobile and truck traffic on new roads constructed to well pads and other facilities, and noise from various development activities. Some recreational use conflicts will occur placing greater demand on protected areas for recreational activities. BLM management decisisons and associated stipulations in ADPs are designed to minimize the impact of development on the environment and on cultural resources. These stipulations assume a level of monitoring and enforcement commensurate with the increased development activity. If appropriate staff and budgetary increases are not made available to the Pinedale FO in a timely fashion, regulatory oversight will be lacking and failure of the Operators to perform properly may result. In some cases, delay in development may occur until BLM staff resources can be applied to resolve resource conflicts in the path of mineral development. More intense interest and focus on transportation management and planning within the RMPPA will be necessary as well as greater coordination between the BLM and county governments regarding road construction and maintenance.

Urban growth and tourism are stimulating recreational development on BLM-administered lands and requiring BLM to place more emphasis on development of more recreational areas, campsite and facilities. In turn, recreational activities are contributing more revenue to the local economy and placing demand on local communities for recreational related services and facilities.

The land ownership patterns in the Pinedale FO are not expected to change dramatically during the next 20 years. The BLM manages its lands for retention, not disposal, and will continue to do so. Land exchanges will continue to be used as the primary tool for land disposal and acquisition, and acquisition priorities will be heavily influenced by recreational and wildlife habitat priorities. The necessity for access to oil and gas well pads and other facilities on public lands will place an increasing burden on BLM staff resources to evaluate and process ROW applications and to monitor the construction and use of access roads and the closure and restoration of mineral access roads once they are no longer needed. Mineral related ROWs can create road density problems and good transportation planning will be required to a greater extent as more roads are proposed and constructed. Close coordination and cooperation with local governmental entities will be necessary to assure proper road maintenance. BLM will continue to emphasize use of transportation corridors for consolidation of transmission and transportation facilities to reduce the environmental impact and the proliferation of ROWs.

Livestock grazing will continue to have a major impact on the BLM-administered lands and the local economy of the RMPPA. The impacts can be both beneficial and adverse depending upon the extent to which good range management practices and stipulations in permits and AMPs are followed. Range improvements and vegetative manipulation will improve range conditions, reduce erosion and provide increased forage over the 20 year planning period. Conflicts will continue to occur between livestock and wildlife for forage in certain areas and seasonally, but the conflicts will be minimized through improved range and wildlife management practices.

Figure 4.3-1. Wild Fire Occurrence and Fire Zones

Map 17: Wild Fire Occurrence and Fire Zones

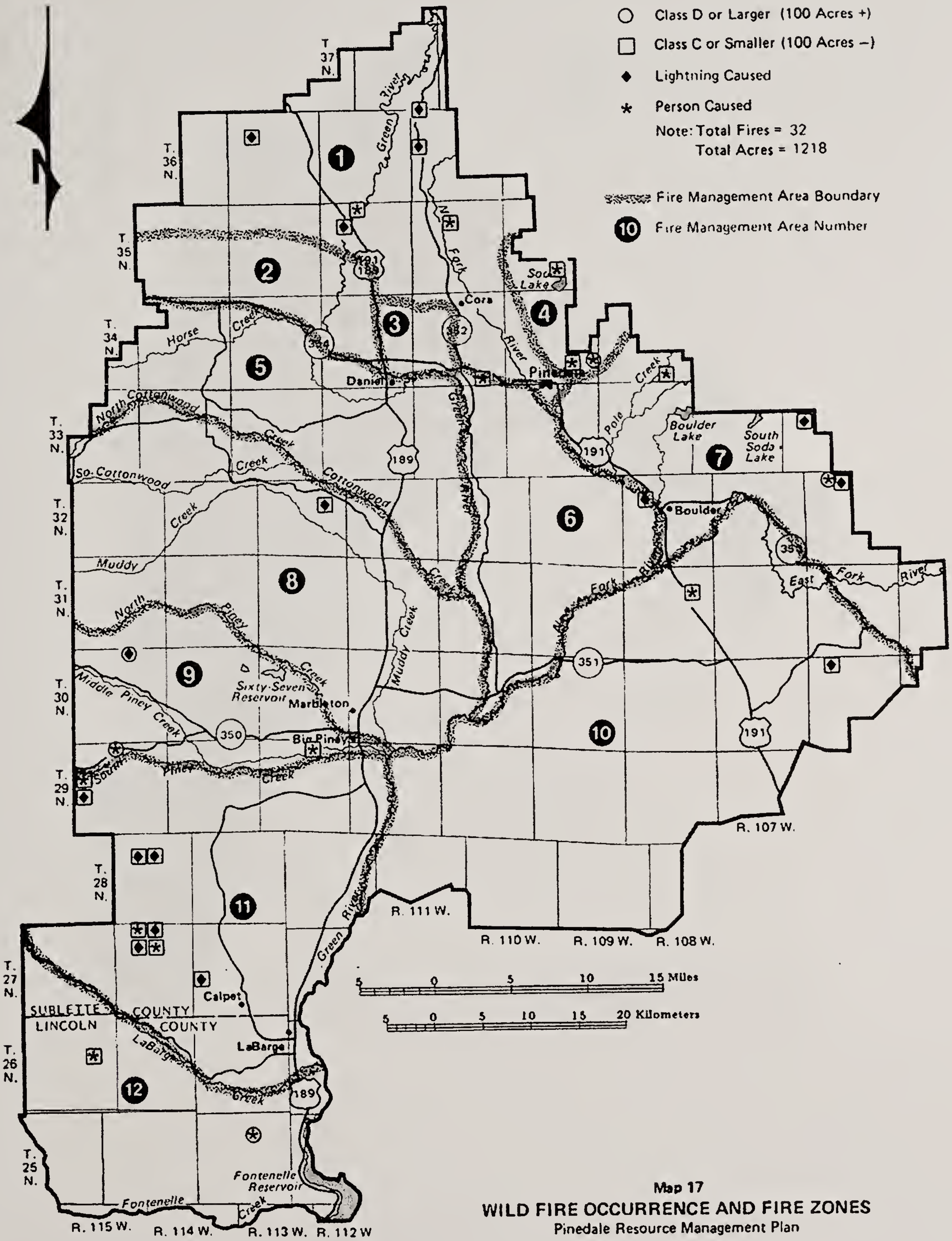
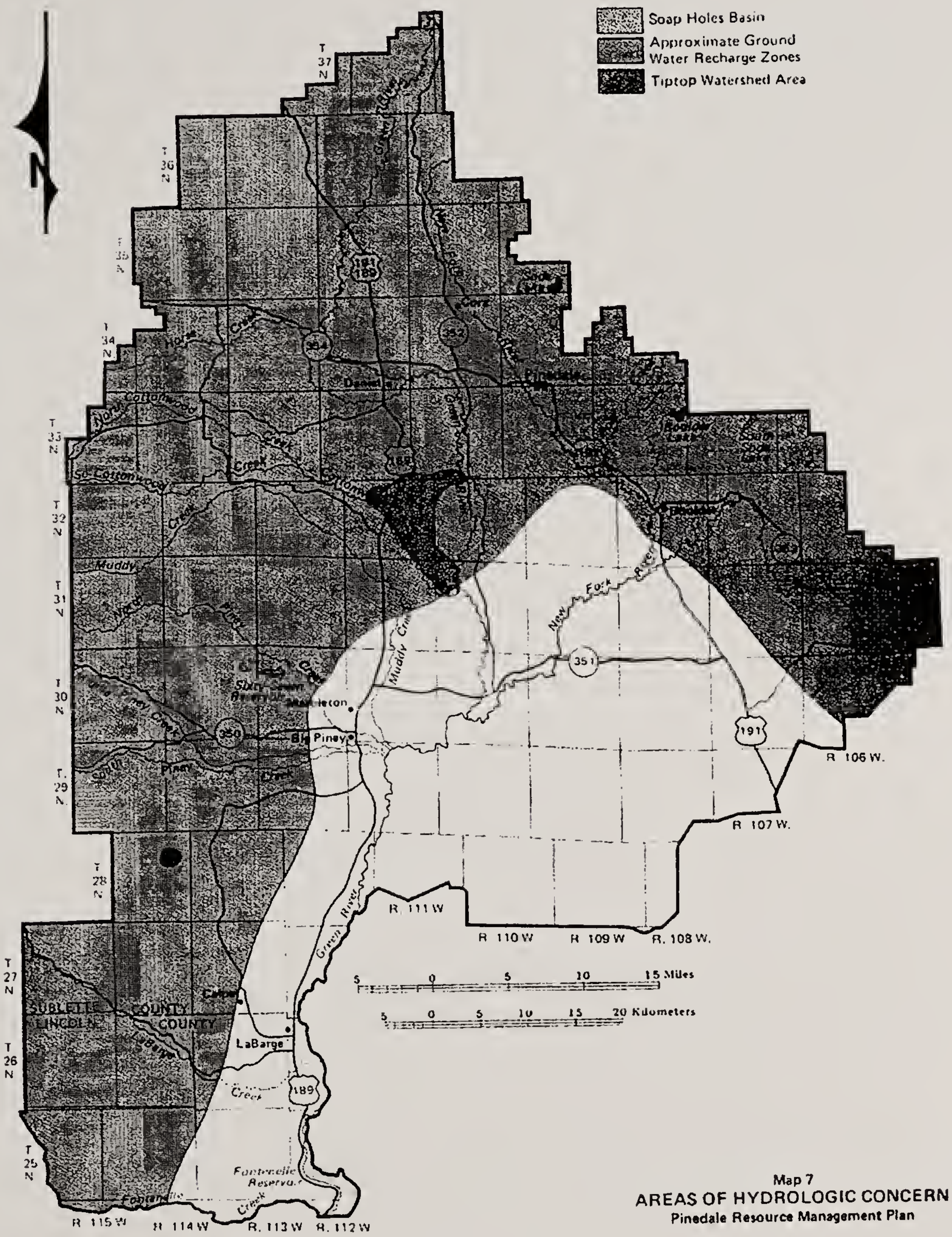

○ Class D or Larger (100 Acres +)
☐ Class C or Smaller (100 Acres –)
◆ Lightning Caused
* Person Caused
Note: Total Fires = 32
Total Acres = 1218
Fire Management Area Boundary
⑩ Fire Management Area Number
N
T. 37 N.
T. 36 N.
T. 35 N.
T. 34 N.
T. 33 N.
T. 32 N.
T. 31 N.
T. 30 N.
T. 29 N.
T. 28 N.
T. 27 N.
T. 26 N.
T. 25 N.
R. 115 W.
R. 114 W.
R. 113 W.
R. 112 W
R. 111 W.
R. 110 W.
R. 109 W.
R. 108 W.
R. 107 W.
Green River
New Fork River
Soda Lake
Cora
Pinedale
Daniel
Horse Creek
North Cottonwood Creek
So. Cottonwood Creek
Cottonwood Creek
Muddy Creek
North Piney Creek
Middle Piney Creek
South Piney Creek
Sixty-Seven Reservoir
Marbleton
Big Piney
Pole Creek
Boulder Lake
South Soda Lake
Boulder
East Fork River
Calpet
LaBarge
LaBarge Creek
SUBLETTE COUNTY
LINCOLN COUNTY
Fontenelle Reservoir
Fontenelle Creek
191
189
354
352
353
351
350
1
2
3
4
5
6
7
8
9
10
11
12
5 0 5 10 15 Miles
5 0 5 10 15 20 Kilometers
Map 17
WILD FIRE OCCURRENCE AND FIRE ZONES
Pinedale Resource Management Plan

Figure 4.17-1. Areas of Hydrologic Concern.

Areas of Hydrologic Concern


Soap Holes Basin
Approximate Ground Water Recharge Zones
Tiptop Watershed Area
T 37 N
T 36 N
T 35 N
T 34 N
T 33 N
T 32 N
T 31 N
T 30 N
T 29 N
T 28 N
T 27 N
T 26 N
T 25 N
R 115 W
R 114 W
R. 113 W
R. 112 W
R 111 W
R 110 W
R 109 W
R. 108 W.
R 107 W.
R 106 W.
SUBLETTE COUNTY
LINCOLN COUNTY
Daniel
Pinedale
Boulder
Marbleton
Big Piney
Calpet
LaBarge
Green River
New Fork River
Muddy Cr.
Fontenelle Reservoir
191
189
354
352
351
350
5 0 5 10 15 Miles
5 0 5 10 15 20 Kilometers
Map 7
AREAS OF HYDROLOGIC CONCERN
Pinedale Resource Management Plan

P-Figure 4.17-1 Hydrologic Concern

GLOSSARY (under development)

ACTIVITY PLANNING. Site-specific planning that precedes development. This is the most detailed level of BLM planning. An activity plan details management of one or more resources on a specific site. Examples are allotment management plans and recreation area management plans. Activity plans implement decisions made in the RMP.

ACTUAL USE. The number of livestock actually grazing on a given allotment. The use made of forage by livestock or wildlife without reference to permitted or recommended use.

ALLOTMENT. An area allocated for the use of the livestock of one or more qualified grazing lessees. It generally consists of BLM-managed lands but may include parcels of private or state-owned lands. The number and kind of livestock and period of use are stipulated for each allotment. An allotment may consist of several pastures or may be only one pasture.

ALLOTMENT MANAGEMENT PLAN. A concisely written program of livestock grazing management, including supportive measures, if required, designed to attain specific management goals in a grazing allotment. An AMP is prepared in consultation with the permittee(s), lessee(s), and other affected interests. Livestock grazing is considered in relation to other uses of the range and in relation to renewable resources such as watershed, vegetation, and wildlife. An AMP establishes seasons of use, the number of livestock to be permitted, the range improvements needed, and the grazing system.

ANIMAL DAMAGE CONTROL. The control of animals that are causing economical losses to agriculture, damage to property, or causing hazards to human health. This control usually results in killing the offending animal(s).

ANIMAL UNIT. A standardized unit of measurement for range livestock or wildlife. Generally, one mature (1,000-pound) cow or its equivalent, based on an average daily forage consumption of 26 pounds of dry matter per day.

ANIMAL UNIT MONTH. A standardized unit of measurement of the amount of forage necessary for the sustenance of one animal unit for one month; also, a unit of measurement that represents the privilege of grazing one animal unit for one month.

APPROPRIATE MANAGEMENT RESPONSE. Specific actions taken in response to a wildland fire to implement protection and fire use objectives.

AREA OF CRITICAL ENVIRONMENTAL CONCERN. An area within the public lands designated for special management attention to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources, or other natural systems or processes, or to protect life and safety from natural hazards.

BOARD FOOT. A unit of solid wood 1 foot square and 1 inch thick.

CASUAL USE. Activities ordinarily resulting in no appreciable disturbance of public lands, resources, or improvements; for example, activities that do not involve the use of mechanized earthmoving equipment or explosives or, in areas designated as closed to ORVs, do not involve the use of motorized vehicles.

CATEGORY 1, 2, or 3 CANDIDATE SPECIES. Classification by the Fish and Wildlife Service, U.S. Department of the Interior, of taxonomic groups or species of plants or animals that are being considered for listing as either threatened or endangered under the Endangered Species Act of 1973, as amended.

Category 1 refers to species or taxonomic groups for which the USFWS has on file substantial information on biological vulnerability and threat(s) to support the appropriateness of proposing to list them as endangered or threatened. Data are being gathered on category 1 species concerning precise habitat needs and, for some, the precise boundaries for critical habitat designations.

Category 2 refers to species or taxonomic groups for which information in possession of the USFWS indicates that listing them as endangered or threatened species is possibly appropriate, but for which substantial data on biological vulnerability and threat(s) are not known or on file. Further research and field study usually will be necessary to ascertain the status of category 2 species, and some will not warrant listing while others will be found to be in greater danger of extinction than some
listed in category 1.

Category 3 refers to species or taxonomic groups that are no longer being considered for listing as threatened or endangered, some because there is persuasive evidence of extinction, some because they do not meet the act's definition of "species," and some because they have proven to be more abundant or widespread than was previously believed.

CLASSIFICATION AND MULTIPLE USE. Refers to both the Classification and Multiple Use Act of 1964 and the classifications that were placed on the lands pursuant to that act. The objective of the C&MU act was to provide an opportunity for the BLM to categorize lands for multiple use management and for disposal. The act provided four years for the BLM to classify lands for multiple use management by prohibiting disposal or entry under various public land laws to be specified in the particular classification document.

The C&MU classifications referred to in this document prohibited disposal under the Isolated Tracts Act (Revised Statutes 2455) and entry under the agricultural entry laws (Homestead Act, Desert Land Act, and others); portions of the C&MUs also prohibited entry under the General Mining Law of 1872. Today, the multiple use provisions of FLPMA fulfill the purpose and objectives of the C&MU classifications.

"CLOSED" DESIGNATION (ORV). Vehicle travel is prohibited yearlong with no exceptions other than for emergency vehicles in emergency situations. Access by means other than motorized vehicles is permitted.

COMMERCIAL FORESTLAND. Forestland that is now producing or is capable of producing at least 20 cubic feet of wood fiber per acre per year from commercial coniferous tree species, and which has met certain economic, environmental, or multiple use criteria for inclusion in the commercial forestland base.

CRUCIAL HABITAT. Habitat on which a species depends for survival because there are no alternative ranges or habitats available.

CRUCIAL WINTER RANGE. The portion of the winter range to which a wildlife species is confined during periods of heaviest snow cover.

CULTURAL RESOURCE. A fragile and nonrenewable remnant of human activity, occupation, or endeavor reflected in districts, sites, structures, buildings, objects, artifacts, ruins, works of art, architecture, or natural features.

CULTURAL RESOURCE INVENTORY. A descriptive listing and documentation, including photographs and maps, of cultural resources. Processes involved are locating, identifying and recording of sites, structures, buildings, objects, and districts through library and archival research; collecting information from persons knowledgeable about cultural resources; and conducting on-the-ground field surveys of varying levels of intensity. Also see Cultural Resource Inventory Classes.

CULTURAL RESOURCE INVENTORY CLASSES. A Class I inventory of a defined area provides a narrative overview derived from existing information and a compilation of existing data on which to base the development of the BLM's site record system. A Class II inventory is a sample-oriented field inventory designed to locate and record, from surface and exposed profile indications, all cultural resource sites within a portion of a defined area to make possible an objective estimate of the nature and distribution of cultural resources in the entire defined area. A Class III inventory is an intensive field inventory designed to locate and record all cultural resource sites within a specified area. Upon completion of such an inventory, no further cultural resource inventory work is normally needed in that area.

CULTURAL RESOURCE MANAGEMENT PLAN. A plan designed to inventory, evaluate, protect, preserve, or make beneficial use of cultural resources and the natural resources that figured significantly in cultural systems. The objectives of such plans are the conservation, preservation, and protection of cultural values and the scientific study of those values.

CULTURAL RESOURCE SITE (cultural property). A physical location of past human activities or events. Cultural properties are extremely variable in size, ranging from the location of a single cultural resource feature to a cluster of cultural resource structures with associated objects.

DISPOSAL. Transfer of ownership of a tract of public land from the United States to another party through sale, exchange, or transfer under the Recreation and Public Purposes Act.

ENDANGERED SPECIES. Any plant or animal species that is in danger of extinction throughout all or a significant portion of its range, as defined by the U.S. Fish and Wildlife Service under the authority of the Endangered Species Act of 1973.

ENVIRONMENTAL ASSESSMENT. A record of the environmental factors involved in a land management action.

ENVIRONMENTAL IMPACT STATEMENT. A written analysis of the impacts of a proposed project and alternatives.

FEDERAL LANDS. As used in this document, lands owned by the United States, without reference to how the lands were acquired or what federal agency administers the lands. The term includes mineral estates or coal estates underlying private surface but excludes lands held by the United States in trust for Indians, Aleuts, or Eskimos. Also see Public Land.

FIRE MANAGEMENT. The integration of knowledge of fire protection, prescribed fire, and fire ecology into multiple use planning, decision making, and land management activities. Fire management places fire in perspective with overall land management objectives.

FIRE MANAGEMENT PLAN. A strategic plan that defines a program to manage wildland and prescribed fires and documents the Fire Management Program in the approved land use plan. The plan is supplemented by operational procedures such as preparedness plans, preplanned dispatch plans, prescribed fire plans and prevention plans.

FIRE SUPPRESSION. All work activities connected with fire extinguishing operations, beginning with discovery and continuing until the fire is completely out.

FORESTLAND. Land that is now, or is capable of becoming, at least 10% stocked with forest trees, which has been developed for nontimber use.

FULL SUPPRESSION. A fire suppression strategy requiring immediate and continuous aggressive attack to attain the suppression objectives with the leastdamage of property or loss of resources in the most cost-effective manner. Such actions may include control, containment, or confinement of wildfire to attain land management objectives.

GRAZING PREFERENCE. The total number of AUMs on public land apportioned and attached to base property owned or controlled by a lessee.

GRAZING SYSTEM. A systematic sequence of grazing use and nonuse of an allotment to reach identified multiple use goals or objectives.

HABITAT MANAGEMENT PLAN. An officially approved activity plan for a specific geographic area of public land. An HMP identifies wildlife habitat and related objectives, defines the sequence of actions to be implemented to achieve the objectives, and outlines procedures for evaluating accomplishments.

INITIAL ATTACK. An aggressive suppression action consistent with firefighter and public safety and values to be protected.

LEASABLE MINERALS. Minerals subject to lease by the federal government, such as coal, oil and gas, oil shale, potash, sodium, phosphate, and other minerals that may be acquired under the Mineral Leasing Act of 1920, as amended. The major leasable minerals in the planning area are oil and gas and coal.

LEK. A site used by grouse for courtship display. Also called "strutting ground" or "dancing ground." The lek is the center point of the annual reproduction cycle. Most nesting occurs within 2 miles of the lek.

"LIMITED" DESIGNATION (ORV). Vehicle travel is restricted in some manner in the area. Restrictions could take many forms, but the most common are "limited to existing roads and trails;" which allows vehicle travel only on roads that were in existence at the time of designation or as authorized for future uses; "limited to designated roads and trails," which allows vehicle travel only on roads that the BLM designates by signs; and "seasonal restrictions," which restricts vehicle travel in an area or on certain roads during some portion of the year (such as wintertime vehicle restrictions to protect big game on crucial winter range).

Under limitations to existing or designated roads and trails, vehicle travel off roads is permitted only to accomplish necessary tasks and only if such travel would not result in resource damage. Necessary tasks are defined as work requiring the use of a motor vehicle. Examples include picking up big game kills, repairing range improvements, managing livestock, and mineral activities where surface disturbance does not total more than 5 acres, as described in the provisions of 43 CFR
3809.1-3.

LIMITED SUPPRESSION. A deviation from normal fire suppression procedures based on a land-use decision or practiced where controlling fires is extremely difficult or dangerous, or where the values at risk do not warrant the expense associated with full suppression. Such fires will receive an appropriate suppression response.

LIMITED SUPPRESSION PLAN. A written fire management plan that is approved by the appropriate line authority and designates limited fire suppression areas. Such plans must include plan objectives, area description, fire history and effects, action planned, and evaluation procedures required.

LOCATABLE MINERALS. Generally, the metallic minerals subject to development specified in the Federal Mining Law of 1872. Examples are gold, silver, and copper.

MITIGATION. A method or process by which impacts from actions may become less injurious to the environment through appropriate protective measures. Also called mitigative measure.

MONITORING. Specific studies that evaluate the effectiveness of actions taken toward achieving management objectives.

MULTIPLE USE. Coordinated management of various surface and subsurface resources so that they are used in the combination that will best meet present and future needs.

NATIONAL REGISTER OF HISTORIC PLACES. The official list, established by the Historic Preservation Act of 1966, of the nation's cultural resources worthy of preservation.

NONCOMMERCIAL FORESTLAND. Land that is not capable of yielding at least 20 cubic feet of wood per acre per year of commercial species; also, land that is capable of producing only noncommercial tree species.

OFF-ROAD VEHICLE. Any motorized tracked or wheeled vehicle designed for cross-country travel over any type of natural terrain. Exclusions (from Executive Order 11644, as amended by Executive Order 11989) are nonamphibious registered motorboats, any military, fire, emergency, or law enforcement vehicle while being used for emergency purposes, any vehicle whose use is expressly authorized by the authorizing officer or otherwise officially approved, vehicles in official use, and any combat support vehicle in times of national defense emergencies.

"OPEN" DESIGNATION (ORV). Vehicle travel is permitted in the area (both on and off roads) if the vehicle is operated responsibly in a manner that will not cause significant undue damage to the soil, wildlife, vegetation, cultural resources, or other important resources on the public lands.

PERENNIAL STREAM. A stream that flows throughout the year.

PREFERENCE. Grazing privileges established following the passage of the Taylor Grazing Act, based on the use of the federal range during the priority period. The active preference and suspended preference together make up the total grazing preference.

PREPAREDNESS. Activities that lead to a safe, efficient, and cost effective fire management program in support of land and resource management objectives through appropriate planning and coordination.

PRESCRIBED FIRE. Any fire ignited by management actions to meet specific objectives. A written, approved prescribed fire plan must exist, and NEPA requirements must be met, prior to ignition.

PRESCRIPTION. Measurable criteria which guide selection of appropriate management response and actions. Prescription criteria may include safety, economic, public health, environmental, geographic, administrative, social or legal considerations.

PUBLIC LAND. As used in this document, federally-owned surface or mineral estate specifically administered by the Bureau of Land Management. Also see Federal Lands.

RANGE IMPROVEMENT. Any activity or program on or relating to rangelands that is designed to improve production of forage, change vegetation composition, control patterns of use, provide water, stabilize soil and water conditions, or provide habitat for livestock, wild and free-roaming horses and burros, or wildlife. Range improvement projects may be fences, reservoirs, brush control, or spring and well developments.

RANGELAND MONITORING PROGRAM. A program designed to measure changes in plant composition, ground cover, animal populations, and climatic conditions on the public rangeland. Studies monitor changes in range condition and determine the reason for any changes. Studies also monitor actual use, forage utilization, trend, and climatic conditions.

RECREATION AND PUBLIC PURPOSES. R&PP refers to both the Recreation and Public Purposes Act [(43 USC 869(a)] and the uses to be made of public land transferred under the act. The objective of the R&PP Act is to meet the needs of state and local government agencies and nonprofit organizations by leasing or conveying public land required for recreation and public purpose uses. Examples of uses made of R&PP lands are parks and greenbelts, sanitary landfills, schools, religious facilities, and camps for youth groups. The act provides substantial cost benefits for land acquisition and provides for recreation facilities or historical monuments at no cost.

RIGHT-OF-WAY. The legal right of use, occupancy, or access across land or water areas for a specified purpose or purposes. Also, the lands covered by such legal rights.

RIPARIAN. Situated on or pertaining to the bank of a river, stream, or other body of water. Normally used to refer to plants of all types that grow rooted in the water table of streams, ponds, and springs.

RIPARIAN COMMUNITIES. Communities of vegetation associated with either open water or water close to the surface. Examples are meadows, aspen, and other trees and shrubs associated with water.

SALABLE MINERALS. Minerals that may be sold under the Material Sale Act of 1947, as amended. Included are sand, gravel, flagstone, scoria, and crushed rock such as limestone.

SAWTIMBER. Trees that have reached sufficient size and maturity to be used for "dimension lumber" such as 2 x 4s.

SEASON OF USE. The time during which livestock grazing is permitted on a given range area, as specified in the grazing lease.

SPATIAL MANAGEMENT. As used in this document, intensive control of the location and level of surface disturbance that would be allowed in a particular area.

SPLIT ESTATE. Surface and minerals of a given area indifferent ownerships. Frequently the surface will be privately owned and the minerals federally owned.

STIPULATION. A condition or requirement attached to a lease or contract, usually dealing with protection of the environment or recovery of a mineral.

STRUTTING GROUND. An area used by sage grouse in early spring for elaborate, ritualized courtship displays. Also see Lek.

SURFACE DISTURBANCE. Disturbance of the vegetative or soil surface by any action. "No surface disturbance" restrictions apply to all activities but casual use and emergency situations such as fire suppression.

SURFACE OCCUPANCY. Placement or construction on the land surface of semipermanent or permanent facilities requiring continual service or maintenance. Casual use is not included.

TEMPORAL MANAGEMENT. As used in this document, intensive control of the period during which the BLM will allow activities that are physiologically disturbing or disrupting to normal wildlife activities such as elk migration.

THREATENED SPECIES. Any plant or animal species that is likely to become an endangered species throughout all or a significant portion of its range, as defined by the U.S. Fish and Wildlife Service under the authority of the Endangered Species Act of 1973.

UNSUITABILITY CRITERIA. Criteria of the federal coal management program by which lands may be assessed unsuitable for all or certain stipulated methods of coal mining. See Appendix II.

VISUAL RESOURCE. Visible feature of the landscape such as land, water, vegetation, animals, and other features that make up the scenery of an area.

VISUAL RESOURCE MANAGEMENT. The system by which the BLM classifies and manages scenic values and visual quality of public lands. The system is based on research that has produced ways of assessing aesthetic qualities of the landscape in objective terms. After inventory and evaluation, lands are given relative visual ratings (management classes), which determine the amount of modification allowed to the basic elements of the landscape.

VISUAL RESOURCE MANAGEMENT CLASSES. Visual resource management classes are the degree of acceptable visual change within a characteristic landscape. A class is based on the physical and sociological characteristics of any given homogeneous area and serves as a management objective. The four classes are described below:

Class I provides for natural ecological changes only. This class includes primitive areas, some natural areas, some wild and scenic rivers, and other similar areas where landscape modification activities should be restricted.

Class II areas are those where changes in any of the basic elements (form, line, color, or texture) caused by management activity should not be evident in the characteristic landscape.

Class III includes areas where changes in the basic elements (form, line, color, or texture) caused by a management activity may be evident in the characteristic landscape. However, the changes should remain subordinate to the visual strength of the existing character.

Class IV applies to areas where changes may subordinate the original composition and character; however, they should reflect what could be a natural occurrence within the characteristic landscape.

WATERSHED. A total area of land above a given point on a waterway that contributes runoff water to the flow at that point. Sensitive watershed is an area with fragile geologic, soil, or vegetative conditions, where small changes in the intensity of land use can cause large changes in erosion rates.

WETLANDS. Permanently wet or intermittently flooded areas where the water table (fresh, saline, or brackish) is at, near, or above the soil surface for extended intervals, where hydric wet soil conditions are normally exhibited, and where water depths generally do not exceed two meters.

WILDFIRE. Any unwanted wildland fire.

WILDLAND FIRE. Any non-structure fire, other than prescribed fire, that occurs in the wildland.

WILDLAND FIRE SITUATION ANALYSIS (WFSA). A decision-making process that evaluates alternative management strategies against selected safety, environmental, social, economical, political, and resource management objectives as selection criteria.

WITHDRAWAL. An action that restricts the use of described public lands from operation of certain laws, which are also described in the withdrawal order. Withdrawal also may be used to transfer jurisdiction or management to other federal agencies.

LIST OF ACRONYMS

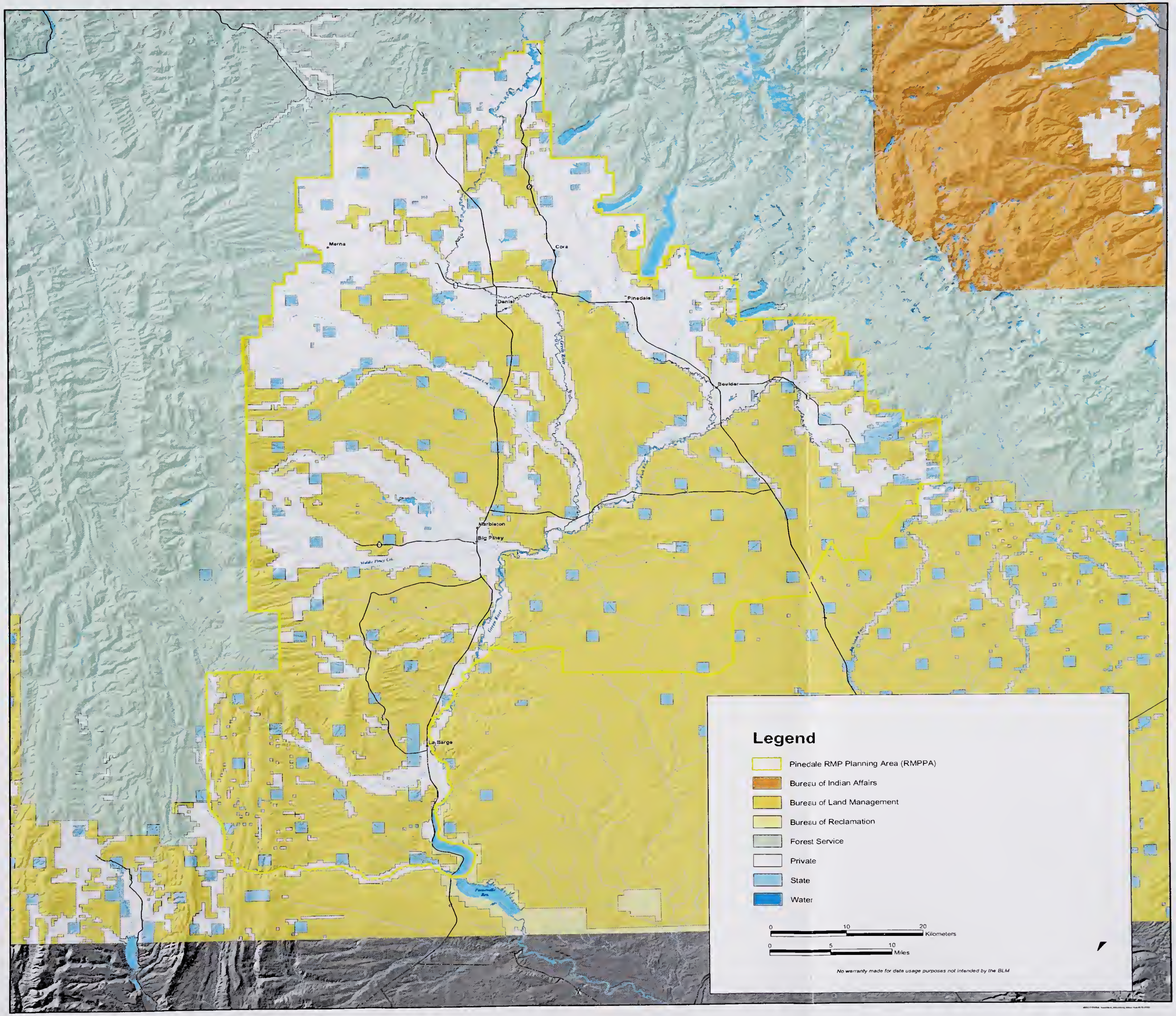
(Note: Acronyms still being developed)

ACEC	Area of Critical Environmental Concern
AMP	Allotment Management Plan
AUM	Animal Unit Month
BLM	Bureau of Land Management, U.S. Department of the Interior
BOR	Bureau of Reclamation, U.S. Department of the Interior
CASTNet	Clean Air Status and Trends Network
CBM	Coalbed Methane
CFR	Code of Federal Regulations
C&MU Act	Classification and Multiple Use Act of 1964
CO	Carbon Monoxide
CRM	Coordinated Resource Management Plan
DEQ	Wyoming State Department of Environmental Quality
dv	Deciviews
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
FLPMA	Federal Land Policy and Management Act of 1976
FS	Forest Service, U.S. Department of Agriculture
H_2SO_4	Sulfuric Acid
HAP	Hazardous Air Pollutants
HMP	Habitat Management Plan
HNO_3	nitric acid
I-80	Interstate 80
IMPROVE	Inter-Agency Monitoring of Protected Visual Environments
MFP	Management Framework Plan
NAAQS	National Ambient Air Quality Standards
NADP	National Atmospheric Deposition Program
NEPA	National Environmental Policy Act of 1969
NGVD	National Geodetic Vertical Datum
NH_4^+	Ammonium
$(NH_4)_2SO_4$	Ammonium Sulfate
NO_2	Nitrogen Dioxide
NO_3^-	Nitrate
NO_x	Nitrogen Oxides
NRCS	Natural Resource Conservation Service, U.S. Department of Agriculture
O_3	Ozone
OHV	Off-Highway Vehicle
PA	Programmatic Agreement
Pb	Lead
PM_{10}, $PM_{2.5}$	Particulate Matter

ppb	Parts Per Billion
PSD	Prevention of Significant Deterioration
RMP	Resource Management Plan
RMPPA	Resource Management Plan Planning Area
SIP	State Implementation Plan
SO_2	Sulfur Dioxide
SO_4^{--}	Sulfate
SRMA	Special Recreation Management Area
$\mu g/m^3$	Micrograms Per Cubic Meter
USDA	United States Department of Agriculture
USDI	United States Department of the Interior
USFWS	U.S. Fish and Wildlife Service, Department of the Interior
VOC	Volatile Organic Compounds
VRM	Visual resource management
WAAQS	Wyoming Ambient Air Quality Standards
WARMS	Wyoming Air Resources Monitoring System
WGFD	Wyoming Game and Fish Department
WSA	wilderness study area
W-SHPO	Wyoming State Historic Preservation Officer

Figure 3.7-1 Land Ownershi

Figure 3.7-1 Land Ownership


Merna
Cora
Daniel
Pinedale
Boulder
Cottonwood Cr.
Green River
Marbleton
Big Piney
Middle Piney Cr.
La Barge
Legend
Pinedale RMP Planning Area (RMPPA)
Bureau of Indian Affairs
Bureau of Land Management
Bureau of Reclamation
Forest Service
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Water
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